2002
ANNUAL BRIDGE REPORT
of the

King County

Department of Transportation
Road Services Division
Structural Design and Bridge Inspection Unit

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GLOSSARY OF BRIDGE TERMINOLOGY

Abutment–A substructure supporting the end of a single span, or the extreme end of a multispan superstructure, and in general, retaining or supporting the approach fill.

Backwall–The top most portion of an abutment functioning primarily as a retaining wall to contain approach roadway fill.

Bent–A supporting unit of the beams of a span made up of one or more column or column-like members connected at their top most ends by a cap, strut, or other member.

Bracing–A system of tension or compression members, or a combination of these, connected to the parts to be supported or strengthened by a truss or frame. It transfers wind, dynamic, impact, and vibratory stresses to the substructure and gives rigidity throughout the complete assemblage.

Cap–The top-most piece or member of a bent serving to distribute the beam loads upon the columns and to hold the beams in their proper relative positions.

Chord–In a truss, the upper-most and the lower-most longitudinal members, extending the full length of the truss.

Deck–Portion of a bridge that provides direct support for vehicular and pedestrian traffic.

Elastomeric pads–Rectangular pads made of neoprene, found between the sub- and superstructure that bears the entire weight of the superstructure. Elastomeric pads can deform to allow for thermal movements of the superstructure.

Endwall–The wall located directly under each end of a bridge that holds back approach roadway fill. The endwall is part of the abutment.

Pier–A structure composed of stone, concrete, brick, steel, or wood and built in a shaft or block-like form to support the ends of the spans of a multispan superstructure at an intermediate location between abutments. This can also be termed a bent.

Pile–A rod or shaft-like linear member of timber, steel, concrete, or composite materials driven into the earth to carry structure loads into the soil.

Pinpile–A series of two-inch diameter pipes driven in a line into the ground to support the timber planks of a small retaining wall, typically used to prevent erosion under a bridge abutment.

Post or column–A relatively short member resisting compressive stresses, in a vertical or near vertical position.

Scour–erosive action of removing streambed material around bridge substructure due to water flow. Scour is of particular concern during high water events.

Soffit–the underside of the bridge deck or sidewalk.

Spall–a concrete deficiency wherein a portion of the concrete surface is popped off from the main structure due to the expansive forces of corroding steel rebar underneath. This is especially common on older concrete bridges.

Stringer–A longitudinal beam (less than 30' long) supporting the bridge deck, and in large bridges, framed into or upon the floor beams.

Substructure–The abutment, piers, grillage, or other structure built to support the span or spans of a bridge superstructure. Includes abutments, piers, bents, and bearings.

Superstructure–The entire portion of a bridge structure which primarily receives and supports traffic loads and in turn transfers the reactions to the bridge substructure; usually consists of the deck and beams or in the case of a truss bridge, the entire truss.

Trestle–A bridge structure consisting of beam spans supported upon bents. Trestles are usually made of timber.

Wheelrail–A timber curb fastened directly to the deck, most commonly found on all-timber bridges.

Wingwall–Walls that slant outward from the corners of the overall bridge that support roadway fill of the approach.

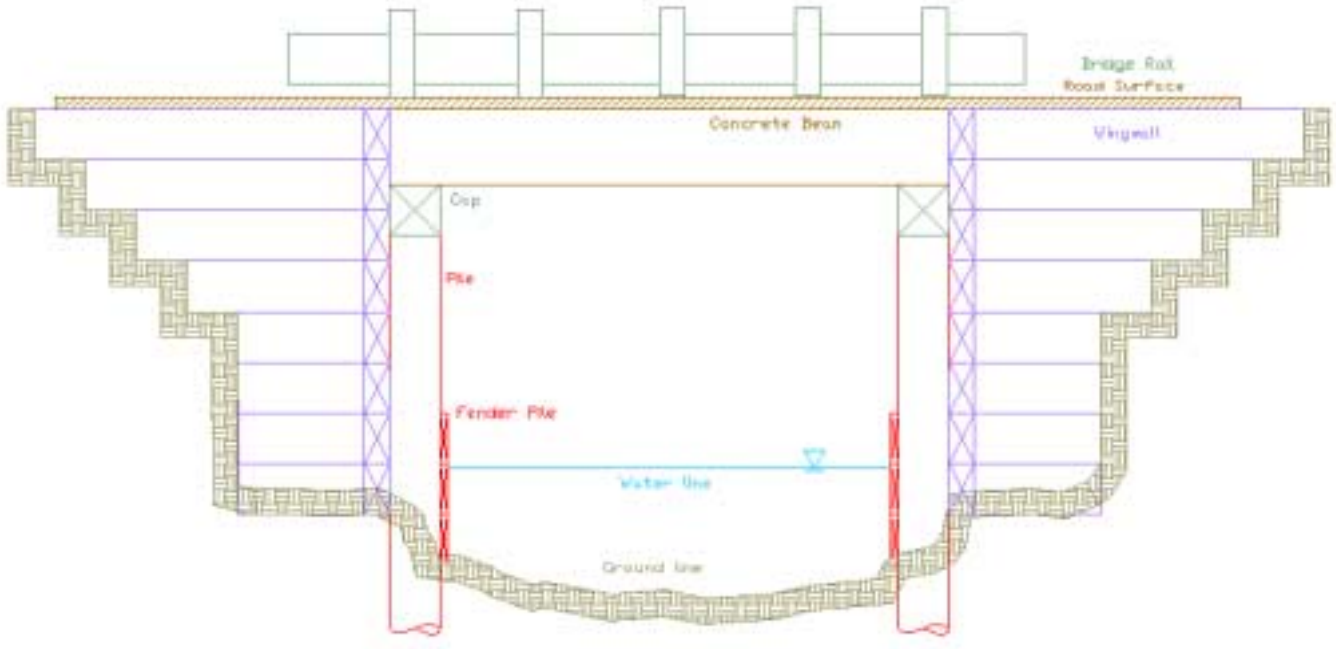
INTRODUCTION

This bridge report summarizes the status of King County's roadway and pedestrian bridges and bridge improvement programs for calendar year 2002. The Bridges and Structures Unit of the Road Services Division prepares this report annually in compliance with RCW 36-78-070. This state law requires each County Road Engineer to furnish the legislative authority with a résumé of the findings of bridge inspections from the preceding year. This report and previous annual reports are available on the Internet at http://www.metrokc.gov/kcdot/roads/eng/bridge.

King County has several active bridge repair and improvement programs. The common goals of the programs are to increase the safety and reliability of the county's roadway bridges through preservation (maintenance) and capital improvement projects. This report presents a summary of each program. Organization of this report begins with Section I on bridge inspections and findings. Section II contains the Bridge Needs Report, which identifies bridges with highest priority for replacement or rehabilitation. Also covered in Section II are the county's Seismic Retrofit Program, and the status of federally funded bridge capital improvement projects. Section III contains load-limited bridges. Section IV includes Bridge Maintenance, Timber Bridge and work for other agencies, notably King County Parks. Section V takes a look at the future of King County's bridge programs and the accompanying changes that will take place.

Throughout the report, several references are made to specific bridges, each of which is uniquely identified by name and number. In order to assist the reader, the complete bridge inventory and location descriptions are included as Table 1 in the Appendix.

TYPICAL BRIDGE SKETCH



I. BRIDGE INSPECTIONS AND FINDINGS

Timber inspection on Wagners Bridge #364B occurs on a 12-month schedule.

Federal requirements for bridge inspection, documented as the National Bridge Inspection Standards (NBIS), mandate that public agencies inspect and report on all bridges (vehicle-carrying structures with a centerline length of over 20 feet) at least once every two years. The purpose of routine inspections is to document the current condition of the bridge, determine the degree of wear and deterioration, and recommend repairs or needed services. Bridges deficient in their condition or load capacity require more frequent inspection, as do those bridges with timber structural members.

Bridges with special features require inspection of those specific features, such as the underwater inspection of submerged structural components. Inspection results are kept in a database called Washington State Bridge Inventory System (WSBIS) developed by Washington State Department of Transportation (WSDOT) and maintained by the Roads Services Division. Periodic updates are sent to WSDOT TransAid as they collect and verify compliance with the National Bridge Inspection Standards (NBIS) and report to Federal Highway Administration (FHWA).

A. Inventory Changes

The Road Services Division inspects and inventories a total of 222 roadway bridges; see Table 1 Bridge Inventory of King County. Of these, 178 are wholly owned by King County. Seven bridges are co-owned with incorporated cities or adjacent counties. Two bridges are owned by King County Parks. The remaining 35 bridges are owned by other jurisdictions that have requested King County inspect and maintain their bridges. The bridge inventory continues to change with changing city boundaries within King County.

Money Creek Bridge #506A

Consistent with RCW 39.34, the Interlocal Cooperation Act, the Road Services Division works with the cities that have bridges to develop agreements for sharing operational costs and establishing a framework for future improvements to bridges that are jointly owned. Also many of the smaller cities in King County have few resources and no expertise when it comes to inspecting and maintaining their wholly owned bridges and rely on the expertise of King County, on a contract service basis, for their bridge engineering needs.

New bridge – Redmond Ridge UPD #901

The following tables summarize all of the changes to the inventory database in 2002 and show the bridges owned by others that King County Road Services is responsible to inspect. Three new bridges were added to the King County inventory in 2002, they are: Redmond Ridge UPD Bridge, and the Cedar Mountain Bridge and Cedar Mountain Ramp that replaced aging structures.

New Bridges to King County Inventory			
Bridge Name	**Number**	**Thomas Guide Pg. #**	**Year Built**
Redmond Ridge UPD	901	537	2001
Cedar Mountain Ramp	3165A	657	2002
Cedar Mountain	3165	657	2002/2003

Status of Joint Ownership Agreement with Cities/Other County Agencies			
Bridge Name	**Number**	**County Agreement**	**City/Agency**
Duvall	1136A	In process	Duvall
Meadowbrook	1726A	In process	Snoqualmie
Lee Hill	3013	In process	Auburn
Green River	3216	In process	Kent

Inventoried Bridges Owned by Cities/Other County Agencies			
Bridge #	**Bridge Name**	**1998 Thomas page no.**	**Owner agency**
3005	Hylebos Creek	774	Federal Way
264X	Swamp Creek	476	Kenmore
1071AE	East Kenmore Bridge	475	Kenmore
1071AW	West Kenmore Bridge	475	Kenmore
5015	Lower Swamp Creek	476	Kenmore
5045	McDonald Highland	505	Kenmore
6001	Fort Dent Park Bridge	655	King County Park
6002	Marymoor Park Bridge	537	King County Park
264Z1	McAleer Creek	475	Lake Forest Park
264Z2	McAleer Creek	475	Lake Forest Park
264Z3	McAleer Creek	475	Lake Forest Park
5017	Hamlin Road Bridge	479	Lake Forest Park
MEDINA #2	Overlake Dr	566	Medina
MEDINA#1	Overlake Dr	566	Medina
368B	May Creek Trestle	626	Newcastle
1135-1	North Bend #1	630	North Bend
1135-2	North Bend #2	630	North Bend
1135-3	North Bend #3	660	North Bend
1135-4	North Bend #4	660	North Bend
1135-5	North Bend #5	660	North Bend
1135-6	North Bend #6	630	North Bend
1135-7	North Bend #7	630	North Bend
422A	Beaver Lake Trestle	598	Sammamish
1011A3	Inglewood	567	Sammamish
3145A	Miller Creek	655	SeaTac
167AOX	Richmond Beach Oxing	474	Shoreline
167C	Hidden Lake	474	Shoreline
SKYKOM-10	Maloney Creek	515	Skykomish
1413B	South Fork of Kimball Cr.	630	Snoqualmie
1413C	East Fork of Kimball Cr.	630	Snoqualmie
10	Leary Way Bridge	537	Redmond
20	NE 85th BRIDGE	537	Redmond
30	Sixty-01 Undercrossing	566	Redmond
45	Union Hill Bridge	567	Redmond
50	Bear Creek	537	Redmond
70	148th Avenue Bridge	537	Redmond
1730A	Bear Creek	537	Redmond
3013	Lee Hill Bridge	746	1/2 Auburn
1136A	Woodinville-Duvall Rd	508	1/2 Duvall
3216	Green River	716	1/2 Kent
3050B	Greenwater River	841	1/2 Pierce County
225C	York Bridge	507	1/2 Redmond
1726A	Meadowbrook Br	630	1/2 Snoqualmie
3179	South Park Bridge	625	1/2 Tukwila

B. Routine Bridge Inspections

Depending on the age, composition, and condition of the bridge, the bridge engineer (certified bridge inspector) determines the inspection frequency. The NBIS allow a maximum interval of two years between inspections, with few exceptions. A total of 135 routine bridge inspections were conducted in 2002.

Lower chord inspection on Edgewick Bridge #617B

Bridge inspectors make an in-depth evaluation of the condition of the bridge structure and record information about any observable defects. When the inspection reveals a deficiency, a maintenance work order is generated and assigned a priority. Urgent structural or safety concerns are promptly addressed.

Bridges that are outside of King County's jurisdiction and owned by local small cities are often part of a joint inspection agreement with the County. King County inspectors perform the necessary inspections and report to the city on defects or deficiencies in that city's bridge inventory. It is then the responsibility of the city to incorporate county-requested maintenance into their budget. Bridge repairs are discussed further in Section IV.

Most bridges show increasing signs of deterioration as a result of age, increased use, and waterway instability. The inspection and maintenance repair records developed over years of observation enable the engineer to make an assessment of the long-term performance of the structure. Many King County bridges were constructed during the 1950s. Most of the bridges from that period were built with timber substructures and are reaching the end of their useful life. Timber bridges generally last between 40 and 50 years, depending on environmental conditions and construction details. The life of many of these bridges has been temporarily extended by repair and replacement of rotted timbers. Eventually, however, they will need replacement.

Hamlin Road Bridge #5017–typical 1950s era short span bridge

County bridges built after 1970 are generally in good to excellent condition. These bridges were designed using modern standards for traffic loads and incorporate materials that will result in long structural life.

C. Special Inspections

UBIT INSPECTION

An Under-Bridge Inspection Truck (UBIT) must be used to perform an inspection if portions of the bridge are not accessible from a ladder. The UBIT is rented from either WSDOT or the City of Seattle under contractual arrangements. A total of 41 bridges are identified for UBIT inspections (see Table 2 in the Appendix). Eighteen bridges were inspected in 2002. These special inspections are performed every two to six years. Bridges with timber or cracked concrete members are inspected every two years and bridges in better condition are inspected every four to six years.

FRACTURE-CRITICAL INSPECTION

Special inspections are required every two years on structures that have fracture-critical members, the failure of which could cause partial or total collapse of the bridge. King County has identified a total of 17 bridges in this category. The schedule for fracture-critical bridge inspections is listed in Table 2 in the Appendix. All but one of the fracture-critical inspections requires the use of a UBIT.

Underbridge inspection of the Elliott Bridge using UBIT

UNDERWATER INSPECTION

Divers conduct underwater inspections of bridges with members in water too deep to permit visual inspection. Inspection of the underwater elements of a bridge is required at least once every five years in accordance with NBIS. A total of eighteen bridges require underwater inspections and the schedule for the underwater inspections is shown in Table 2 in the Appendix.

SCOUR EVALUATION

In 1988, federal requirements for bridge inspections were updated to include mandatory scour evaluations for all bridges that cross water. The update, which was implemented in response to the 1987 collapse of the Schoharie Bridge in New York, focused national attention on the issue. Scour evaluations examine bridge abutments and piers that may be damaged as a result of water surging around the structure and eroding soils on which the structure is supported. The implementation of the federally mandated scour evaluation program in the State of Washington requires all agencies responsible for bridges to complete scour evaluations. Of King County's bridges, 42 have been determined to be "scour-critical." A scour-critical bridge could potentially experience rapid erosion during flood events, and the foundation of the bridge could be undermined, causing partial or total collapse of the bridge.

D. Bridge Monitoring

The Bridge Monitoring Program enables the county's bridge engineers to check the status of bridge deficiencies closely until county or contractor resources are available to correct the problems. Carefully monitoring bridge deficiencies minimizes disruption of the road network, saves time and resources by scheduling repairs as conditions warrant, and provides an additional safeguard to the public. Monitoring typically involves measuring various elements of a bridge to determine if cracks, corrosion, settlement, or other movements have worsened. Thirty-four bridges are currently in the monitoring program.

Issaquah Creek Bridge # 83B, flood debris buildup against intermediate bent can cause pier scour.

MONITORING TIMBER MEMBERS

Meadowbrook Bridge #1726A–*rotted caps crushing*

Mt. Si Bridge #2550A–*rotted caps crushing*

Cottage Lake Creek #240A–*rotted caps crushing*

Sikes Lake Trestle #2133A–*rotted caps crushing*

Baring Bridge #509A–*rotted sills crushing*

Newaukum Creek #3063–*timber cap splitting*

NE 124th Street #124C–*rotted caps crushing*

Bandaret #493B–*rotted cap crushing*

Tolt #1834A–*rotted caps crushing*

Soos Creek #3109–*rotted cap crushing*

Hamlin Road #5017–*rotted caps crushing*

Lower Swamp Creek #5015–*rotted cap crushing*

Wagners #364B–*rotted log stringers*

Sunday Creek #364C–*rotted log stringers*

Measuring wall tilt at Rock Creek Timber Culvert

MONITORING TILTING STRUCTURE

Rutherford Slough #920A–*timber abutments tilting*

South Park Bridge (14th/16th Ave. S.) #3179–*Bascule piers tilting*

Patterson Creek Bridge #180L–*retaining wall tilting*

15 Mile Creek Bridge #1384B–*pile tilting*

One of several cracks engineers monitor on the South Park Bridge #3179

MONITORING CRACKED CONCRETE MEMBERS

York Bridge #225C–*concrete beams cracking*

Tokul Creek Bridge #61G–*concrete beams cracking*

West Kenmore Bridge #1071AW–*concrete beams cracking*

Hidden Lake Bridge #167C–*concrete columns cracking*

Skykomish River Bridge #999Z–*concrete endwall and pedestal cracking*

Judd Creek Bridge #3184–*concrete box beams cracking*

Wynaco Bridge #3194–*concrete beams cracking*

Marymoor Park Bridge #6002–*concrete column cracking*

Lake Dorothy Bridge #359B–*concrete box beams cracking*

MONITORING CHANNEL EROSION

Wagners Bridge #364B–*pier scour*

Sunday Creek Bridge #364C–*abutment scour*

SE 408th Street Bridge #3056A–*abutment scour*

North Bend Bridge #1135-3–*pier scour*

Issaquah Creek #83B–*abutment scour*

Duvall Slough #1136B–*lateral migration of channel*

OTHER MONITORING

Landsburgh #3075–*bearing pad movement*

Raging River #234A–*bearing pad movement*

Rock Creek Timber Culvert at SE 248th St.–*scour and wall tilt*

Semanski Bridge #3198–*crushing timber blocks*

II. BRIDGE PROGRAM SUMMARIES

A. Needs Report

The King County priority process for bridge replacement projects uses criteria approved by the King County Council (Ord. 11693). The priority process establishes the need for individual bridge replacement by score and rank. The process examines the functional and structural deficiencies of each bridge and the results are used to help plan and program major bridge studies and construction projects in the Roads Capital Improvement Plan (CIP). The bridges with the highest priority for replacement or rehabilitation are listed in Table 4 in the Appendix.

Normally, the priority of each bridge changes slowly as it ages and operational demands increase. Occasionally a bridge deteriorates significantly due to a specific event and receives a high priority ranking, especially if it requires a posted load limit. Shifts in priority rank among bridges are expected when major deficiencies are corrected through implementation of a capital project.

An example of shifting priority rank occurred when the Duvall Bridge #1136A required a posted load limit and its priority rank went from twentieth to ninth in 2001. After the load upgrade, re-deck, and traffic rail improvements in 2002, the priority score dropped and the priority rank changed from ninth to seventy-fifth.

Bear Creek Bridge #333A showing guardrail, utility lines and gauging station.

The 2002-2007 Adopted Roads CIP funds nineteen (19) major bridge improvement projects that address the twenty-nine (29) highest priority bridge replacement and upgrade needs. The county's oldest steel truss bridges, which were built around 1920, are the predominant bridge type in need of replacement. This type of bridge has several inherent deficiencies in roadway geometrics (height and width) and usually has a posted load limit. The Tolt Bridge shown here is a good example of a steel truss bridge with numerous deficiencies. Five of the six highest priority projects in the 2002-2007 Adopted Roads CIP are replacement or rehabilitation of old steel truss bridges.

The rest of the high priority bridges listed in Table 4 are constructed of concrete, timber, or steel and have reached the end of their useful life.

Two of the top priority bridges, which are not currently programmed in the CIP, are Fifteen Mile Creek Bridge #1384A and Bear Creek Bridge #333A. Fifteen Mile Creek Bridge is a very narrow concrete bridge on Issaquah Hobart Road about three miles south of Issaquah. It is functionally obsolete and carries over 16,000 vehicles

Tolt Bridge #1834A looking west

daily. Funding for a study to determine whether the bridge can be widened will be included in the proposed 2004-2009 CIP. Bear Creek Bridge #333A carries NE 133rd Street over Bear Creek, north of the city of Redmond. The bridge is only twenty feet long and is structurally deficient in the timber substructure. It lies between two other road improvement projects. Replacement of the bridge will be added to the scope of work for the NE 133rd Street project 100701, which currently includes a new multi-use trail bridge.

Fifteen Mile Creek Bridge No. #1384A

Several other substandard bridges of timber (substructure) and concrete (deck girder) construction appear among the top priority bridges for replacement. Many of these bridges are short, less than 20 feet long, and do not qualify for federal bridge replacement funding. These short-span timber bridges are becoming increasingly difficult to repair as traffic increases and estimated replacement costs are being driven up by strict environmental and design standards. A programmatic approach, rather than individually funded projects, may be an effective way to deal with the growing number of this particular type of structure in need of replacement.

Alvord T Bridge #3130 over the Green River

Also among the high-priority bridges are the Alvord "T" Bridge, Miller River Bridge, Baring Bridge, and Horseshoe Lake Bridge. All of these bridges will remain in service with regular maintenance and no capital improvements are currently planned.

The Alvord T Bridge will be maintained and operated at its present condition per agreement with the city of Kent. The county performed an analysis that indicated that the bridge could be permanently closed, but it borders the city of Kent and is in the city's potential annexation area. Kent preferred to postpone the decision to close the bridge until after traffic patterns are established following recent development and roadway work in the area. If the bridge is not annexed to the city, the county will reassess the need to keep the bridge open.

The Miller River Bridge near Skykomish was repaired and painted in 1997. The *Repair Report,* prepared by the county's consultant, recommended "repair" based on the estimated costs, low traffic volume, lack of alternative routes other than Highway 2, and environmental considerations. The riverbanks were also armored with rock to repair storm damage and prevent further erosion. Although it is narrow, the steel truss is in good condition and serves the needs of the area. The repair did not include upgrades to load carrying capacity, new traffic rails or seismic retrofit. The estimated remaining service life of the bridge is 25 years and further improvements will be considered through existing programs.

The Baring Bridge is a unique, one-lane timber suspension bridge, with a posted load limit of ten tons. In 1993, King County decided to rebuild the bridge rather than replace it; therefore, though it still ranks high in the priority system, there is no plan to upgrade the bridge in the near future. The bridge requires frequent inspection and maintenance and the suspension cable towers are showing signs of deterioration due to age.

The Horseshoe Lake Creek Bridge has a high priority score primarily because it has a posted load limit. It is at the end of a side road serving one property and is not heavily traveled. The cost of replacement is probably not justified, but that option will be examined when the bridge is scheduled for seismic retrofit and load upgrade.

Baring Bridge #509A spans the Skykomish River

B. Seismic Retrofit/Load Upgrade Program

PROGRAM FOUNDATIONS

The King County Bridge Seismic Retrofit/Load Upgrade Program has been active for nine years. This program is predicated on the known seismic activities in King County and on the risk a major seismic event poses to the public and bridges. In 1994, the County Roads Division completed a Bridge Seismic Study that analyzed our bridge inventory, ranked the relative need of retrofits for each bridge, and prepared a cost analysis. One hundred and seventeen bridges were identified as needing retrofits. The four elements that comprise the need for a retrofit include:

Bear Creek Bridge #333A with seismic restraint fittings on the underside of the bridge

- **Structural Vulnerability** - the capacity of the bridge to withstand seismic induced loads
- **Importance Factor** - significance of roadway, traffic volumes, detour length and cost of replacing or retrofitting the bridge
- **Seismicity Factor** - the local geology and type of bridge foundation
- **Life Hazard Potential** - the possibility of severe injury or loss of life in the event of an earthquake

Three levels of bridge seismic capacity were evaluated in the study (Level I, II, III). The levels were provided to show the relationship of cost to retrofit and quality of retrofit as described below. Costs are in 1994 dollars and were estimated based on various retrofit needs for all bridges.

Level I: Bridges retrofitted to this level would avoid catastrophic failure but would likely be left with substantial damage. Estimated cost was $17,000,000.

Level II: Bridges at this level would likely sustain minor damage but would be repairable. Estimated cost was $24,000,000.

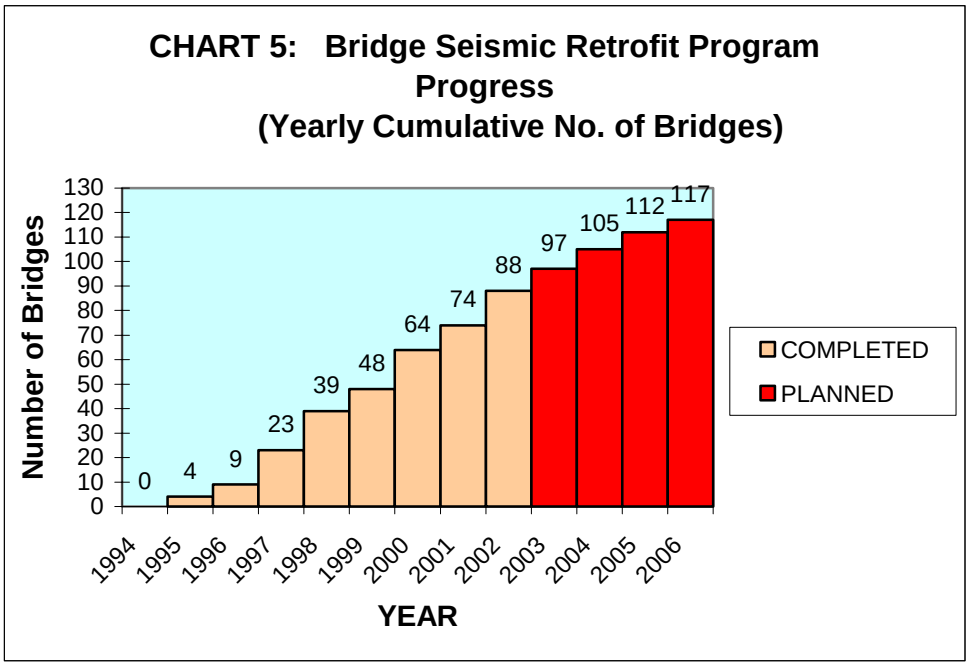
Level III: Bridges retrofitted to this level would likely withstand a seismic event and still be in serviceable status. Estimated cost was $58,000,000.

King County Road Services Division was directed by the Council to concentrate on Level II seismic retrofit efforts and to incorporate load capacity upgrades when feasible. Bridges scheduled for replacement or rehabilitation within 10 years were excluded from the program.

2002 PROGRAM ACTIVITIES

In 2002, the Road Services engineering group completed seismic retrofit construction on nine bridges. In addition, engineers concluded that one bridge scheduled for retrofit had sufficient strength to satisfy the Level II goal and did not require any retrofit work. During the same period, design progressed on four additional bridges. Table 5 in the Appendix summarizes the program activities in 2002, and gives future projections.

By the end of 2002, the Seismic Retrofit Program had completed 88 of the 117 bridges originally scheduled for seismic resistance upgrades. Chart 5 below shows the yearly progress of the Program.



Discussed below are the 2002 Program activities of five selected projects.

Woodinville-Duvall Bridge #1136A Load Upgrade

This bridge is located along the Woodinville-Duvall Road over the Snoqualmie River, just west of the city of Duvall. It carries two lanes of traffic supported by twelve concrete box girder spans for an overall length of 1,182-feet. The 1951 bridge carries more than 18,000 vehicles daily and is a vital link for the surrounding valley communities.

A UBIT inspection in 2000 revealed many diagonal shear cracks at the girder webs. The bridge deck surface was cracked and deteriorated exposing aggregates and reinforcing bars, and the expansion joints showed evidence of leakage. The bridge was also seismically vulnerable due to its rocker type bearing, insufficient seating width, and weak pier columns and foundations.

The county and city shared common goals for the project–to preserve public investment in the bridge and to immediately restore the regional mobility, which was inhibited due to the load restriction on the bridge. Due to budget limitations, the county focused the 2002 construction project scope into three elements: load capacity, deck, and bridge rail upgrades. Seismic retrofit construction is scheduled for 2004.


Woodinville-Duvall Bridge #1136A Load Upgrade

Construction for the load upgrade in 2002 included the installation of a steel hanger system bolted to the steel box/channel beam transferring live loading to the concrete box girders. In addition, elastomeric pads were used at one end of the hangers to dampen vibrations. The concurrent construction of a new traffic rail required the bridge to be closed to all traffic. King County stipulated a compressed construction schedule in the construction contract to mitigate the impact of traffic congestion caused by the project. The bridge was re-opened on September 14, one week ahead of schedule. Total construction cost was $1.8 million.


Kanaskat Bridge #3037OX railroad crossing

Kanaskat Bridge #3037OX

Kanaskat Overcrossing Bridge located along Cumberland Kanaskat Road over the Burlington Northern and Santa Fe Railroad (BNSF) tracks, near Kanaskat Palmer State Park. The bridge was vulnerable to seismic events due to insufficient bearing-seat width and lack of restrainers at the bridge piers to prevent girders from dropping onto the tracks during an earthquake. The project included installation of seismic restrainers and extension of the bearing seat width. Total construction cost was $57,000.


Installing seismic restrainers on Sikes Lake Bridge #2133A

Sikes Lake Bridge #2133A

Located near Carnation on 284th Avenue NE over Sikes Lake, this 25-year old bridge has concrete slab units that total 260 feet in length supported by timber pile bents. Seismic vulnerabilities included insufficient connections between the slab units and the pile cap

beams, and between the pile cap beams and piles. In addition, the bridge was flexible and likely to experience excessive movement along the direction of traffic during a seismic event.

The project design was initiated in August 2000 and advertised for construction in September 2001. The seismic upgrade measures included new steel brackets connecting the concrete slab to the timber pile cap beams, and steel plates and angles connecting the pile cap beams to the timber piles. New longitudinal bracing was added to reduce bridge sway in the event of an earthquake. Total construction cost was $78,000.

North Fork Bridge #122I

This 52 year-old bridge is located in a rural area north of the City of North Bend, along 428th Avenue SE over the North Fork of the Snoqualmie River. This 252-foot long bridge consists of two 65-foot reinforced concrete box girder spans and one 115-foot drop-in steel center span.

North Fork Bridge #122I with center steel span

Seismic deficiencies found on this bridge included weak connections at the drop-in steel span supports, up to 12-inches of potential settlement due to liquefiable soils, and potential bridge collapse due to insufficient reinforcing at bridge columns and pier walls.

After consideration of factors including average daily traffic, public risk, detour route, costs, permit process, construction access, and environment impacts, the project team recommended the Level I retrofit strategy, which was approved by the County Road Engineer. The retrofit will include 6-foot diameter drilled shafts at each abutment to withstand seismic loads from the bridge girders. In addition, the retrofit will include longitudinal restrainers and catcher brackets at the center drop-in span supports.

Construction is currently scheduled for the summer of 2003. The estimated $580,000 construction cost is partially funded by a federal grant.

Skykomish River Bridge #999Z

Skykomish River Bridge #999Z

Constructed in 1958, this bridge is located approximately 170-feet south of State Route 2 (Steven's Pass Highway) near Money Creek campground. The two-lane bridge is 24-feet wide and 254-feet in length and consists of three spans.

Seismic deficiencies found on this bridge include weakness at pier bearing connections and insufficient bearing seat. It is also likely the pier columns and abutment walls will crack or overturn due to inadequate reinforcement and small footing.

The project design was 90% complete at the end of 2002. The proposed retrofit measures include adding concrete catch wall at abutments and

replacing approach fills. In addition, the work will include installations of new bearings, bumper and restrainer systems, girder stops, and steel cross frames at the intermediate piers.

Construction is scheduled for the summer of 2003. Closure of the bridge will have minimal impact to the public because of an available detour route and light traffic. Construction cost is estimated at $520,000 and will be partially funded by a federal grant.

PLANNED SEISMIC PROGRAM ACTIVITIES IN 2003
In 2003, the program goals are to: initiate retrofit design on 11 to12 bridges, continue design on all active projects, and construct 8 to 10 bridge seismic retrofits.

Specifically, the 2003 Program will initiate designs for Upper Tokul Creek, Deep Creek, Raging River, Green Water bridges plus seven to eight more short-span bridges, as well as continuing the Woodinville-Duvall 1136A bridge design. Construction is planned on North Fork, Skykomish, and Foss River bridges plus five to seven other shorter span bridges. Program expenditure in 2003 is estimated at $2.0 million.

C. CIP Project Status

During 2002, there were 25 active individual bridge CIP projects, excluding small bridge seismic retrofits, major repairs, and other bridgework accomplished under countywide programs. The CIP projects range from preliminary studies to final design and construction of new bridges or improvements. The scope of this report is not intended to provide a status review of all CIP bridge projects, however, the status of a few CIP projects is included because of changes to the project or because of the bridge's importance to the operational capability of the roadway system in King County.

The status of active bridge projects is listed in Table 4 (replacement) and Table 5 (seismic retrofit), both in the Appendix. More detailed information is available for each project by contacting the appropriate project manager, or the County Road Engineer. The King County Roads' CIP web site http://www.metrokc.gov/kcdot/roads/projects/ has information on all bridge projects.

Cedar Mountain Bridge

The Cedar Mountain Bridge Replacement Project is located near the city of Renton just east of the intersection of State Route 169 and SE Jones Road. Serious deterioration on the Cedar Mountain Bridge and Ramp prompted the need for a replacement project. The old bridge was built in 1949 and had exceeded useful life; full replacement was more cost effective than rehabilitation. The scope of the project included replacing both structures to meet current safety standards, and to improve upon the containment and dispersion of roadway contaminants. Construction on the bridge started in May 2002 and was completed March 2003, three months ahead of schedule. Cedar Mountain Bridge was built in two stages to allow traffic uninterrupted use of SE Jones Road. The timber ramp was removed and a new driveway access was built 580 feet south of the intersection of SR 169 and SE Jones Road to

Drilled shaft on Cedar Mountain Bridge, #3165


Cedar Mountain Bridge #3165 new construction

accommodate the five properties adjacent to the Cedar River. The new driveway was completed in September 2002. The total cost of the project is $7.5 million, with $5 million spent on construction.

Preston Bridge #682A

The Preston Bridge was planned for rehabilitation until the foundation depth of the main pier was found insufficient. State and county bridge engineers were concerned that the existing pier would be susceptible to washout and earthquake failure even after rehabilitation. The Preston Bridge project then underwent a scope change from rehabilitation to replacement in early 2002. The grant administration agency, Washington Department of Transportation (WSDOT) approved this scope change in its Spring Bridge Replacement Advisory Committee (BRAC) meeting in May 2002.


Preston Bridge #682A intermediate pier with pier wall cracks and timber shoring post

The design work for the new replacement bridge was completed in 2002. Two public meetings were held to inform the community and request public comment on the project. The final bridge configuration will be a 240-foot two-span concrete bridge with a twenty-eight foot wide deck that will accommodate two eleven-foot traffic lanes. With the community input, the county's new design will retain the pedestrian walkway on the south side of the bridge and increase its width to five feet. Construction will take place in 2003 from April to November with the roadway closed to all traffic.

South Park Bridge #3179

The county's only moveable bridge is co-owned with the City of Tukwila and carries 14th/16th Avenues South over the Duwamish River in the South Park/Boeing Field area. The bridge, with traffic of 20,000 vehicles per day, is structurally deficient, functionally obsolete, maintenance intensive, and seismically vulnerable. It suffered significant damage in the 2001 Nisqually Earthquake. The King County Department of Transportation is conducting an Environmental Impact Statement (EIS) to study five alternatives for the bridge site in order to find an effective, feasible, long-term solution for the bridge. Alternatives include three new bridge designs as well as rehabilitation of the existing bridge and closure of the bridge.


South Park Bridge # 3179 view looking upriver

The EIS is on an aggressive two-year schedule. In September 2003, the preferred alternative is selected, closely followed by preliminary design of this preferred alternative. The final Record of Decision and end of the EIS effort is scheduled for early 2004.

King County is coordinating extensively with the Project Advisory Committee (PAC), comprised of the cities of Seattle and Tukwila, as well as a variety of regulatory agencies, including the Federal Highway Administration, United States Coast Guard, Washington State Department of Transportation, U. S. Environmental Protection Agency, The U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Port of Seattle, and the National Marine Fisheries Service.

The project team also meets regularly with the Citizens Advisory Group (CAG), a group of citizens representing local and regional interest in the future of the bridge. The CAG provides valuable perspective to the EIS process. Additional work is underway to determine the makeup of the underlying soils and levels of contamination from industrial uses of the Duwamish River at the bridge crossing. The results of soils work will be used to further refine the feasibility and cost of the alternatives.

Tolt Bridge #1834A

The Tolt Bridge was originally constructed in 1922, and does not meet current seismic, safety and roadway geometry standards. The bridge is scheduled for replacement in order to eliminate specific deficiencies of the existing bridge, including limited sight distance, narrow roadway width with no shoulder, and limited load capacity. The bridge requires frequent maintenance with traffic closures. Representatives of FHWA and WSDOT approved a bridge replacement grant after a field review to verify the bridge's deficiencies. Because the existing bridge is a King County Landmark and eligible for listing on the Federal Register of Historic Places, alterations or demolition of the bridge will require formal consultation with the State Historic Preservation Officer (SHPO) and a Certificate of Appropriateness from the King County Landmarks Commission.

Tolt Bridge #1834A

The proposed replacement is a steel plate girder bridge with a cast-in-place concrete deck supported by single column piers. To minimize environmental impacts, piers will be placed outside the ordinary high water mark of the river. The new bridge will be on a parallel alignment allowing the existing bridge to carry traffic during construction.

The estimated cost to construct the new bridge is $8.1 million; total project cost is estimated at $12.9 million. The federal bridge grant will fund 80% of the eligible costs. The project requires acquisition of property to accommodate the realignment of the road, as well as concurrence from federal agencies and permits from several regulatory agencies. The project is scheduled for construction in 2004.

Meadowbrook Bridge #1726A

The Meadowbrook Bridge is a historically significant bridge built in 1921 across the Snoqualmie River at the Snoqualmie city limits. The bridge has been designated as a King County Landmark and provides important local access for the communities that have developed near the city. The proposed project would rehabilitate the bridge as a one lane, signal-controlled section of roadway. The current bridge provides two lanes of vehicular traffic. A full replacement of the bridge is not feasible due to high cost and environmental constraints. Also, the current and projected traffic volumes do not justify a new bridge. The project is funded by a federal grant. The rehabilitated bridge will serve the needs of the area through the planning period of 20 years or longer.

Meadowbrook Bridge #1726A

Elliott Bridge #3166

The Elliott Bridge is a very narrow steel truss bridge across the Cedar River, east of Renton. A replacement project was initiated in 1987 with a federal bridge grant. The construction contract was awarded in 1998; however, construction was postponed as the proposed bridge construction was determined to have potential impacts on Chinook spawning habitat. Consequently, additional environmental studies were required, including formal consultation with NMFS before the project redesign and mitigation plans could be finalized. In addition, a supplemental EIS was produced in 2002. Construction is estimated at $8.4 million and scheduled to begin in February 2004.

Elliott Bridge #3166 view of narrow driving lanes

D. Painting

King County owns a total of 26 steel bridges that are painted according to a schedule established in 1993. Bridge painting is restricted to summer months because of weather and permit conditions and is done for structural preservation, not aesthetic reasons.

Table 6 in the Appendix lists the painting schedule for all of the steel bridges. Six of these bridges are major CIP candidates and painting is not considered as a separate project. The Raging River Bridge #234A has been replaced with a concrete girder bridge and no longer requires painting. Green River Gorge Bridge #3032 received a federal grant in 2000 and painting was completed in 2001. The construction cost was about $1.0 million and the cost was driven by the complete removal and disposal of the existing lead based paint. Removing the paint and preparing the surface was labor intensive and was subjected to meet the containment and ventilation requirements for worker safety and environmental protection. The new paint system consists of single component moisture cure urethane. The Green River Bridge #3216 is scheduled for painting in 2005.

III. LOAD LIMITED BRIDGES AND STATUS SUMMARY

A. Posted Bridges

FEDERAL GUIDELINES FOR POSTING AND LOAD RATING BRIDGES

In the 1950s and 1960s there was a surge in bridge construction throughout the nation. In King County alone over one hundred new bridges were built. Unfortunately, little or no regard for the maintenance and inspection of bridges accompanied the bridge boom. The catastrophic failure of Virginia's Silver Bridge in 1967 quickly brought attention on the lack of national bridge inspection standards and safety to transportation officials. The National Bridge Inspection Standards (NBIS) came to be the national policy for uniform bridge inspection in 1971, a product of the Federal Highway Act of 1968.

A 1988 amendment to the NBIS by the FHWA (Federal Highway Administration) required that all bridges be load rated and that load-restricted bridges be posted. This provision is now included in the minimum inspection requirements set forth in the NBIS (Section 23 CFR, chap. 1 [04/01/02 Edition] 650.301-650.311). The American Association of State Highway and Transportation Officials (AASHTO) determine standard practices for load rating bridges. A bridge load rating is the measure of a bridge's load carrying capacity. There are two capacity levels, the Inventory Rating and the Operating Rating. The Inventory Rating is the load that a bridge can safely carry for an indefinite number of loading cycles without detriment to the bridge. The Operating Rating is the maximum load that can be carried on an infrequent basis without detriment to the bridge.

CURRENT STATUS OF LOAD RESTRICTED BRIDGES

Load restrictions were removed from the Duvall A Bridge #1136A and the Cedar Mountain Bridge Ramp #3165A within the past year from two different construction processes. A load upgrade was constructed and completed on the Duvall A Bridge in September 2002. As a result of the reinforcing for the load upgrade, the 20-ton load limit restriction was removed and the bridge now safely carries an estimated average daily traffic (ADT) of 17,000 vehicles each day; 10% of which are large trucks. The Cedar Mountain Timber Bridge ramp was removed also in September 2002 and replaced with a new driveway access located 580 feet south of the old ramp location.

The table on the following page summarizes the status of each load-restricted bridge. There are currently 15 King County owned bridges with posted load restrictions. Detailed information on these bridge restrictions is available at http://www.metrokc.gov/kcdot/roads/eng/bridge/loadlimt.htm and is also included in the Table 3 of the Appendix.

Efforts to replace or upgrade load-limited bridges are encompassed by the Road Services Division's Capital Improvement Program (CIP). There are currently 10 load-posted bridges actively in the process of planning, design, or construction for replacement, rehabilitation, or load-upgrade. Whenever feasible, the load carrying capacity of a bridge is increased so that it can carry legally loaded trucks. Additional information about the status of the CIP projects listed below can be found in Section II-C of this report.

LOAD-LIMITED BRIDGES					
	Bridge Name	**Bridge Number**	**Avg. Daily Traffic**	**Current Status**	**Project ** CIP #**
1	**York**	**225C**	4270	**Replacement 2004-05** *(Federal Grant)*	100298
2	**Edgewick**	**617B**	1470	**Replacement 2004-05** *(Federal Grant)*	200498
3	**Preston**	**682A**	277	**Replacement 2003-04** *(Federal Grant)*	200397
4	**Tolt Bridge**	**1834A**	2950	**Replacement 2004** *(Federal Grant)*	200394
5	**Mount Si**	**2550A**	3000	**Replacement 2007-08** *(Federal Grant)*	200994
6	**Elliott**	**3166**	11,594	**Replacement 2004-05** *(Federal Grant)*	401288
7	**Harris Creek**	**5003**	2393	**Replacement 2005** *(Federal Grant)*	200200
8	**Meadowbrook**	**1726A**	2450	**Rehabilitation 2005** *(Federal Grant)*	200294
9	**Wynaco**	**3194**	1363	**Rehabilitation 2004** *(Federal Grant)*	400102
10	**Kelly Rd./Cherry**	**5008**	1560	**Rehabilitation 2004** *(Federal Grant)*	200600
11	**Horseshoe Lake Creek**	**257Z**	60	**Pending Load Upgrade** in 2003	
12	**Wagners Bridge**	**364B**	60	**Pending Replacement** Resubmit for BRAC grant in 2003	
13	**Baring**	**509A**	200	Upgraded to 10-Tons in 1995	
14	**Miller River**	**999W**	156	Repair construction completed in 1997; no load upgrade planned	
15	**Alvord "T"**	**3130**	2167	Maintain and Operate per agreement with the City of Kent	
	** More information about current CIP projects is located in Section II-C of this report.				

Five of the load-posted bridges are not currently active projects in the CIP for upgrade or replacement. Each of these bridges is discussed below.

Wagners Bridge # 364B comprised of rough-hewn logs

The **Horseshoe Lake Creek Bridge #257Z** is currently scheduled for evaluation in 2003 as part of the Seismic Retrofit Program, RCDW10. The feasibility of a load-upgrade or replacement of the bridge will be considered at that time.

Wagners Bridge #364B was posted with a load limit in 1998 as a result from the new load rating analysis that was necessary when routine inspection revealed a deteriorated condition in the untreated log stringers. The bridge serves only recreational traffic and will likely be replaced.

Although eligible for federal grant funding, the bridge was denied a grant by the Bridge Replacement Advisor Committee (BRAC) in 1999 due to the bridge's low ADT and a high demand for grant funds with other high priority bridge projects owned by other agencies. The bridge will be resubmitted for funding in 2003. Until then it will be monitored and operated with a posted load limit.

The **Baring Bridge #509A** is a unique, one-lane timber suspension bridge, with a posted load limit of ten Tons. In 1993, King County opted to rebuild the bridge and operate it with a load limit rather than replace it because of the community input and low traffic; therefore, there are no plans to upgrade the bridge. This bridge is inspected frequently and requires repairs several times each year.

The **Miller River Bridge #999W** near Skykomish was repaired and painted in 1997. The *Repair Report* prepared by the county's consultant recommended repair based on the estimated costs, low traffic volume, lack of alternative routes other than Highway 2, and environmental/historical considerations. The riverbanks were also armored with rock to repair storm damage and prevent further erosion. Although it is narrow, and 80 years old, the steel truss is in good condition and serves the needs of the area. The repair did not include upgrades to load carrying capacity and geometry to meet the current standards. The estimated remaining service life of the bridge is approximately 25 years.

Miller River Bridge #999W steel through-truss

Alvord T Bridge #3130 crosses the Green River at Third Avenue South near the city limits of Kent. The bridge is in Kent's potential annexation area and the county has entered into an

agreement with the city to maintain and operate the bridge in the current condition pending annexation and until traffic patterns are established following improvements to South 277th Street.

B. Overload Permits

The King County Bridge Unit issues overload truck permits to vehicles crossing King County bridges whose gross truck weight either exceed the posted load limit or exceed Washington State limits for legal truck weight. The primary function of overload permits is to prohibit unsafe loads on bridges and to reduce long-term damage to the county's bridges caused by overloaded truck traffic. Permits are also issued to serve special transportation needs and to regulate traffic flow around overweight/ oversized loads. Overload permit applications are now available on King County's web site, www.metrokc.gov/KCDOT/ROADS/eng/bridge/over/overld.htm, and are issued through the Property Services Division. Also available on the website, Table 3 of the Appendix lists the posted load limits and alternate routes for each bridge.

Preserving the public's investment and protecting the public's safety are key components in the permitting process. Two factors affect the structural capacity of the county's older bridge inventory: 1) they were built to lower load capacity design standards than modern bridges and 2) the bridge aging process has accelerated because of the harsh environment and high service loads on county roads.

Because there is the possibility for structural damage either caused by a single-use, high-impact load, or sustained exposure to repetitive heavy loads; each permit is evaluated on a case-by-case basis. Repetitive loads exceeding the bridge's inventory rating accelerate aging and normal wear of the structure, increasing the need for maintenance and repair. Although overloaded truck movements are discouraged, they are sometimes essential for emergency service vehicles and for the transportation of construction-related equipment and efficient movement of goods.

Permit requests are evaluated and compared to the standard truck configuration that most closely resembles the actual truck configuration. If the truck has an unusual configuration of axles, a separate analysis may be necessary. Occasionally, haulers are required to reduce or separate their loads in order to cross a bridge safely. The permit process is managed through the Property Services Division, and the County Road Engineer's approval has been delegated to engineers in the Bridge and Structures group in order to expedite the process.

There were 27 over legal load permits processed for the 2002 year. Multi-use permits were issued for four bridges. Table 3A in the Appendix lists the bridges, number of permits issued and the period for which a multi-use permit was issued. A review of bridge conditions is done prior to re-issuance of a permit for the posted bridges.

IV. MAINTENANCE PROJECTS

Bridge structures are built to provide service for an estimated lifespan. The lifespan of a particular bridge is based on the design type, construction materials, environmental conditions, and traffic volume over that structure. Proper maintenance and repairs on all bridges not only prevents their deterioration but also extends their useful life. King County's limited funds cannot replace all of its aging bridges when they have exceeded their useful life, therefore a portion of county resources are dedicated to bridge repair and rehabilitation projects. This step extends the useful life of our structures and reduces major repair costs in the future. The following programs address these needs.

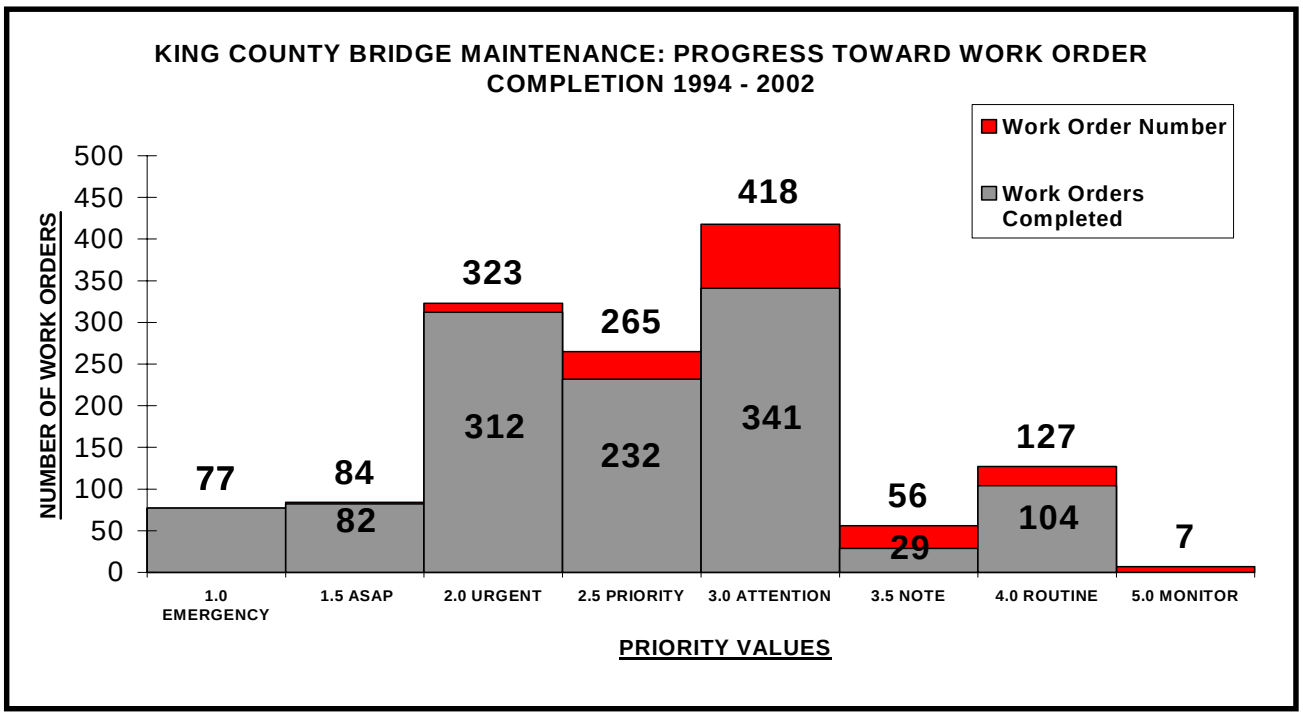
A. County Force Maintenance

Routine and special inspections reveal deficiencies in bridges such as steel corrosion, damaged guardrail, rotten timbers, deteriorated bridge decks, bank erosion, and cracked and spalled concrete. These items are identified by the bridge engineer during an inspection, documented in the report, and repaired via work orders issued for maintenance action by county forces. Most work orders range in priority from "emergency" status priority 1, necessitating immediate repair, to "routine" status priority 4, indicating that work should be performed within a few years to extend the life of the bridge. Priority 5 work orders identify conditions that are monitored, but not yet considered for repair.

Typical deck repair on a truss bridge

The Bridge Maintenance Chart below identifies work orders by priority category. The chart shows all work orders identified since 1994 and the number that have been completed. The chart does not show work orders that are on-hold or pending status, since most of these work orders are not in the county's control, involving bridges in contract cities that need city approval before repairs can begin.

In 2002, 103 new work orders resulted from bridge inspections and 103 work orders were completed. Currently, 180 work orders remain incomplete. Although no net progress was made towards completing some of the 180 incomplete work orders, it is important to note that the majority of these incomplete work orders are lower priority. These work orders identify long term maintenance needs that should be addressed in the next couple years before the isolated repairs are likely to develop into more costly, widespread repairs.



In general terms, increased traffic, heavier trucks, and an ever-aging bridge inventory all contribute to the generation of work orders. And while a significant number of work orders are completed each year, increased environmental regulation is the main reason even more work orders are not completed. Ninety three percent of the bridge inventory is over or near water, necessitating that work be done in the summer during periods of low fish activity, known as “fish windows.” These fish windows are typically between 14 and 90 days long. Stricter environmental regulations due to the Endangered Species Act (ESA) dictates nearly all bridge repairs over or near water are performed in this short window of opportunity. Work is tightly scheduled during this time, leaving little to no margin for revisions to the schedule due to weather, changed conditions, emergencies or other reasons. Despite high overtime expenditures, all repairs cannot be performed during each year’s fish windows and work orders not completed are subsequently carried over to the following year.

When fish windows close, bridge crews work from autumn through spring on select bridge projects that have little to no impact on fish and their habitat. However, these jobs are less prevalent and often the bridge crews are loaned to other county sections to work on non-bridge maintenance projects. While this arrangement keeps the crews busy all year, the bridge maintenance crews are unable to perform the specialized work they do best throughout the entire year, due to this uneven, seasonal workload.

Bridge #228F pile supporting cap

B. Timber Bridge Repairs

In 1994, detailed inspections of the county’s 104 bridges with timber members revealed that 70 bridges had timber deficiencies. Between 1995 and 1997, 50 bridges with the worst timber deficiencies were repaired under the $1.5 million Timber Bridge Repair Program. The Special Operations Unit of the Road Services Division’s Maintenance Section performed repairs, which typically included replacing the severely rotted caps

Bridge #228F with banded pile

or piles of the bridge substructure. The piles and caps are critical members that support the driving deck of the bridge.

In 2000, another in-depth inspection of the entire timber bridge inventory was undertaken. Seven deficient bridges were repaired in 2001 when the second phase of a new three-year, $1.1 million Timber Bridge Repair Program began.

In 2002, five more bridges were repaired. All outstanding work orders on each bridge were completed at the time of the timber repairs to maximize efficiency. For example, seismic retrofits and guardrail upgrades were installed, if warranted, during timber repairs to reduce permitting and mobilization/ demobilization efforts.

The five bridges repaired in 2002 were:

1. 312th Avenue SE (#228F)–*installed seismic retrofit, banded split piling, replaced caps*
2. 284th Avenue SE (#3049)–*scour repair, replaced caps and backwall planks*
3. Coal Creek (#1086B)–*installed seismic retrofit, encased rotten piling, upgraded rail system, repaired backwall planks*
4. Upper Tokul Creek (#271B)–*replaced post*
5. Baring Bridge (#509A)–*secured loose span*

The timber in these bridges, and most of the other 100+ timber bridges in the inventory, is over 50 years old. Considering the normal life span of treated timber is 40 to 50 years, the county should expect and plan to address more problems with these timber members in the future. Although the timber members in these bridges will continue to rot over time, the extensive repairs made during both of these Timber Bridge Repair Programs will significantly extend the life of the county's timber bridges.

C. South Park Bridge Repairs

The South Park Bridge is a Scherzer Rolling Lift double leaf bascule bridge that spans the Duwamish River near Boeing Field. Built in 1930-31, it is the longest King County-owned bridge in the inventory, spanning ¼ mile from end to end. The bridge, formerly known as the 14th/16th Avenue South Bridge, is an important regional arterial that carries an average of 20,000 vehicles per day.

Increased maintenance efforts since 1995 have improved the reliability of the electrical and mechanical systems of the moveable spans but concrete, electrical and bascule pier movement problems continue to plague maintenance efforts. In addition, the Nisqually Earthquake in 2001 weakened the structure and necessitated $693,000 in repairs. Total operational and maintenance expenditures in 2002 totaled $323,044. The City of Seattle, through interagency agreements with King County, provided skilled contracted labor to help the county with the repair of this bridge in 2002.

Major corrosion discovered in rack support frames at steel to concrete interface South Park Bridge #3179

Since 1989, King County has jointly owned the bridge with the city of Tukwila, and all operation and maintenance costs were split evenly between the two agencies. This agreement with Tukwila terminated at the end of 2002 as the result of an interlocal agreement so that King County now assumes the full cost of operations and maintenance in return for a $3 million payment by the city. The payment may be used by the county for maintenance or for rehabilitation/replacement costs.

After completing a guide track repair project at the end of 2001, crews discovered major corrosion in the rack support frames near the concrete floor. The rack support frames are comprised of steel members that support the racks of the rack and pinion gear system. These frames withstand the lateral load of the pinion gear during bascule span openings and closings. Major corrosion was found on all four rack support frames in roughly 50 separate locations.

Because the piling supporting the main bascule piers is insufficient, the piers of the South Park Bridge continue to crack and move over time. The Nisqually earthquake in 2001 shifted the south bascule pier approximately $^{3}/_{16}$" necessitating major repairs to the steel spans to restore operation to the bridge. Bridge engineers have mounted highly sensitive tiltmeters to the piers and continue to monitor this movement. More steel repairs to the spans are anticipated in 2003 to counter the effect of the pier movement.

D. Priority Maintenance

Many of the county's bridges are beginning to show signs of distress with age, such as cracks or spalling of concrete, settlement of roadway approaches, or deficiencies on the bridge deck. CIP-funded construction contracts under the Bridge Priority Maintenance program partially or fully fund major maintenance work performed by in-house bridge maintenance crews and those jobs that are beyond the resource capabilities of the in-house crews.

Split and rotted pile cap

Interior cap with extensive wood rot

The county bridge maintenance crews completed a variety of repairs under the Bridge Priority Maintenance program in 2002. The crews repaired concrete spalls at Evans Creek Bridges #952A and #952B. Both bridges had significant spalling at the concrete girders and the deck soffit.

Deck repairs were undertaken at three bridges. On Berrydale Bridge #3086OX, the deteriorated asphalt surfacing was removed and the bridge deck was repaved. This repair will significantly extend the life of the timber deck that supports the asphalt surfacing. On Preston Bridge #682A,

deteriorated sections of asphalt surfacing were removed and repaved, and rotted portions of wheel rail were replaced. The bare timber deck and wheel rail on Soos Creek Bridge #3109A was replaced with new timber planks and wheel rail. This type of deck is still common for low volume roads.


Parks Trestle #2266-16 timber inspection

Abutment repairs were conducted at three bridges. On Fifteen Mile Creek Bridge #1384A, a pinpile wall system was installed at both abutments as an erosion countermeasure to prevent approach settlement. On Boise X Bridge #3055A, six rotten piles at the west abutment were encased with concrete. As a result of vehicular damage to the southwest wingwall, the wingwall at Boise X was also completely rebuilt. Erosion countermeasures were installed at both abutments of Issaquah Creek Bridge #83D.

E. Maintenance Work for Other Agencies

The King County bridge engineers and maintenance crews not only work on King County Roads Division bridges, they also assist other county divisions and incorporated cities with their bridge needs.

The King County Parks Division maintains a regional trail system that contains 100 bridge structures, many of which are railroad-type timber trestles dating back to the early 1900's. In 2002, the King County Facilities Management Division, steward of these bridges, again requested the King County Bridge Unit to inspect the condition of ten more bridges in the inventory. To date, 25 of the 100 bridges have been inspected.

Six of the ten bridges inspected in 2002 were tall, massive timber trestles, each comprised of hundreds of timber members. To aid in the inspection of these taller trestles, bridge engineers developed a lightweight scaffolding system to provide access to important areas immediately below the deck and out of reach of ladders. This system compliments other access techniques used to access lower portions of the bridge.

Engineers found several serious deficiencies in bridge timber members in 2001. Four bridges were closed to Parks Division maintenance vehicles but remained open to non-vehicular users. Repairs were made to all four bridges in 2002 and the bridges were reopened. Repairs were no sooner completed than engineers discovered serious deficiencies on two bridges on the Preston Snoqualmie Trail during the 2002 inspection cycle. These two bridges remain closed to Parks Division maintenance vehicles until repairs can be arranged in 2003.


Engineers utilizing lightweight scaffolding system to inspect high areas of trestles


Bridge maintenance crews installing deck on golf course Bridge #2606-1

Other deficiencies, not serious enough to close the bridge but significant, nonetheless, have been found on every bridge inspected thus far and the list of needed repairs is extensive. The majority of the repairs involve rotted timber members, which generally begin to rot after 40-50 years. Considering 63 bridges out of the 100-bridge inventory contain timber, the average age of these structures is 70 years old, and only one third of these timber bridges have been inspected, a long list of repairs can be expected once a full inspection cycle has been completed.

Bridge maintenance crews replaced a decrepit log stringer bridge (#2606-1) on the county-owned Enumclaw Golf Course in September 2002. The 50-foot long bridge over Boise Creek was designed and built by county forces at the request of the King County Facilities Management Division. The new span is roughly ten feet longer than the old span, keeping bridge structure out of the creek and providing a larger hydraulic opening for storm events. Various plantings along the bank of the creek improve the area's habitat.

King County bridge engineers will work closely with the Facilities Management Division to coordinate inspections of the remaining 75 bridges in the inventory. If the Facilities Management Division budget is adequate, repairs will be performed on those bridges with the highest needs, such as those that are currently closed to maintenance vehicles.

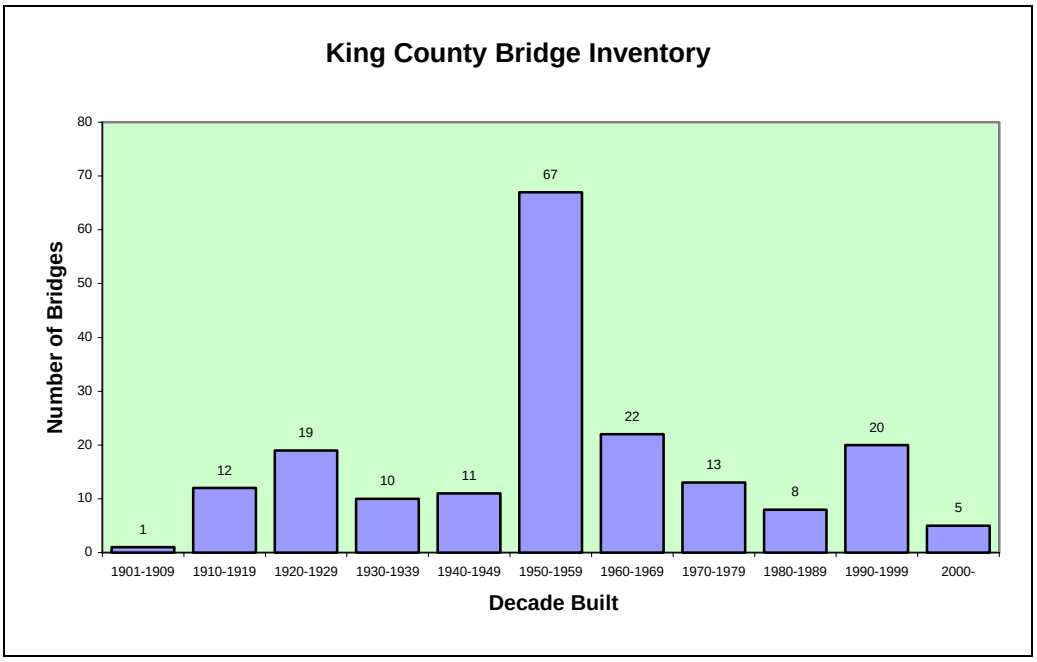
King County inspects the bridges of 16 incorporated cities within the county on a contract service basis. In 2002, thirteen work orders were generated as a result of deficiencies on these city bridges, but King County must first obtain city approval before repairs can begin. Currently, there are 57 work orders for the various cities that are pending city approval. King County Road Services Division will schedule this work once the cities approve of the work orders.

Replacement cap is lowered into place with crane on Parks Dept. Bridge #2266-27

Maintenance crews installing pile cap on Bridge #2266-27

V. LONG-TERM PLANNING

Bridge construction in King County during the 1950's was prolific. Over fifty short-span timber bridges were built in 1950 and 1951 alone, and sixty-seven of the bridges built that decade are still in service today as shown in the chart below. The 50's bridges are of simple design and are short spans about twenty feet long. The timber support structure is comprised of treated timber piling and cap beams that support concrete deck units. Because the timber members begin to rot after forty to fifty years of service, this type of bridge has been problematic in the past decade.



In 1995, King County launched the first phase of the Timber Bridge Repair Program, a three-year effort to extend the service life of dozens of bridges that had rotten main support timbers. The second phase of the repair program is underway and will conclude in 2003. This program provided a good short-term solution to the problem but continued high-cost maintenance is not a viable long-term strategy for dealing with these bridges.

Other King County bridge programs are succeeding in preserving and improving the county's bridges. The Bridge Replacement Program corrected trends of declining bridge construction in the 70's and 80's. The Bridge Seismic Retrofit Program has retrofit 88 bridges to withstand earthquakes and is on target for completion of 117 retrofits by end of 2008. Also, diligent efforts have reduced the backlog of bridge maintenance work orders. However, none of the current programs adequately address the emerging need to replace numerous 1950s era timber bridges.

Typical short span bridge with encroaching abutments

There are two features of the timber bridges that make it difficult to deal with the large number of bridges that need to be replaced. The old bridges encroach into the streams they cross, which necessitates building a much longer bridge when replaced. In many instances the new bridge needs to span sixty to eighty feet to protect the sensitive areas adjacent to the stream. Also, bridge replacement project funding has come from federal grants that only apply to bridges longer than twenty feet. Unfortunately, the majority of these bridges are less than twenty feet in length; consequently, alternative sources of funding will need to be obtained for timber bridge replacements.

A programmatic approach for replacing deficient timber bridges will be formulated as part of the county's Road Safety, Rehabilitation and Retrofit Program. Under the programmatic approach, timber bridges would be evaluated and the worst ones would be scheduled for replacement, rather than repairing or reconstructing them. This program would be an adjunct to the county's existing bridge replacement priority process.

APPENDIX

TO

2001 ANNUAL BRIDGE REPORT

Table 1 - BRIDGE INVENTORY

	Br #	Br Name	1998 Thomas page #	Width	Length	Yr Built	Yr Reblt	Facilities Carried	Location	Features Intersected	Jurisdiction
1	10	Leary Way Bridge	537	48	114	1992		Leary Way	0.4 S Jct SR 908	Sammamish River	Redmond
2	20	NE 85th Bridge	537	56	178	1985		NE 85th Street	0.5 W Jct SR 202	Sammamish River	Redmond
3	30	Sixty-01 Undercrossing	536	44	36	1970		Old Redmond Rd	0.2 W 140th Ave	Access Road	Redmond
4	45	Union Hill Bridge	537	61.5	114	1994		Union Hill Road	0.1 W Avondale Rd	Bear Creek	Redmond
5	50	Bear Creek Bridge	537	63	52	1979	1988	Avondale Road	0.4 N Jct 520/202	Bear Creek	Redmond
6	55	Bear Creek Ranchette	507	6	52	1971	1993	Foot Bridge	.6 Mi N of Redmond	Cottage Lake Creek	
7	63	Welcome Lake Bridge	508	28.7	32	1984		218th Ave NE	1 Mi E of Avondale	Colin Creek	
8	70	148th Ave Bridge	537	51	505	1991		148th Ave SE	0.1 Mi N Jct SR 908	Hillside	Redmond
9	901	Redmond Ridge Upd	537	32.4	196	2001		Redmond Ridge Dr NE	300' NW of NE 80th St	Wetland	
10	1000	Tye River Ped Bridge	164	6	80	1996		Old Cascade Hwy	4 Mi N of Hwy 2	Tye River	
11	1105	Tuck Ck Temp Bridge	508	11.5	30	1999		W Snoqualmie Valley Rd	1 Mi W of Hwy 203	Tuck Creek	
12	3005	Hylebos Creek	774	22.8	16	1951		S 373rd St	0.2 E Pacific Hwy	Hylebos Creek	Federal Way
13	3013	Lee Hill Bridge	746	48	219	1973		8th Street NE	.4 Mi E Harvey Rd	Green River	1/2 Auburn
14	3014	Neely Bridge	746	28	240	1970		Auburn Black Diamo	.2 Mi NE of Hwy 18	Green River	
15	3015	Patton Bridge	776	24	430	1950		Se Green Valley Rd	1.5 Mi Se of Hwy 18	Green River	
16	3017	Circle Water Br	777	26	45	1926	1965	Se Green Valley Rd	4.1 Mi E of Hwy 18	Green River Tributary	
17	3020	Green Valley Road	777	22.8	20	1950		Se Green Valley Rd	5.5 Mi E of Hwy 18	Drainage Ditch	
18	3022	Green Valley Road	777	22.8	20	1954		Se Green Valley Rd	6.7 Mi E of Hwy 18	Drainage Ditch	
19	3024	Flaming Geyser	777	34.5	362	1991		228 Place SE	.2 E Green Val Rd	Green River	
20	3025	Whitney Bridge	777	38	250	1990		Whitney Road	.1 S Green Val Rd	Green River	
21	3027	Whitney Hill	777	37	63	2000		218th Ave SE	0.8 S Green Val Rd	Newaukum Creek	
22	3030	SE 380 St	778	22.8	16	1950		SE 308th St	1 Mi W of Shw 169	Slough	
23	3032	Green River Gorge	748	14	437	1914	1991	Franklin Road	4 Mi E of Hwy 169	Green River	
24	3036	Kanaskat Arch	749	24	220	1918	1955	Cumberland-Kanaske	0.1 S Kanaskat	Green River	
25	3038	Veazie Bridge	778	26	56	1950		Veazie-Cumberland	0.3 N SE 392 St	Coal Creek	
26	3041	Newaukum Creek	808	27.7	70	1958		SE 416th St	.9 Mi E of Hwy 169	Newaukum Creek	
27	3042	Newaukum Creek	808	28	16	1926	1969	SE 416th St	.8 Mi E of Hwy 169	Newaukum Creek	
28	3043	Newaukum Creek	808	28	16	1925	1969	SE 416th St	.6 Mi E of Hwy 169	Newaukum Creek	
29	3049	284 Ave SE Bridge	838	22.8	20	1950		284th Ave SE	.5 S of SE 456th St	Boise Creek	
30	3051	Boise Creek	838	18	16	1927		276th Ave SE	.3 Mi S Warner Ave	Boise Creek	
31	3052	Boise Creek	838	24	19	1927	1959	268th Ave SE	.2 Mi S Warner Ave	Boise Creek	
32	3060	208th Ave SE	807	26.8	16	1951		208th Ave SE	Intsect.SE 448th St	Drainage Ditch	
33	3063	Newaukum Creek	808	22.8	40	1950		SE 416th St	.6 Mi W SE 416th St	Newaukum Creek	

	Br #	Br Name	1998 Thomas page #	Width	Length	Yr Built	Yr Reblt	Facilities Carried	Location	Features Intersected	Jurisdiction
35	3066	Newaukum Creek	808	28	49	1927	1955	236th Ave SE	.5 Mi N of Shw 164	Newaukum Creek	
36	3068	Newaukum Creek	808	21.6	32	1928		244th Ave SE	.2 Mi N of SE 436th	Newaukum Creek	
37	3069	Newaukum Creek	808	26	24	1939	1956	248th Ave SE	Inters. SE 433rd St	Newaukum Creek	
38	3071	Newaukum Creek	808	24	40	1950		SE 424th St	.5 Mi W of Hwy 169	Newaukum Creek	
39	3075	Landsburg Br.	718	38	130	1982		Landsburg Road	1.5 N Kent Kangl.Rd	Cedar River	
40	3082	Covington Creek	747	24	19	1915		Auburn-Blackdiamond	.3 N of SE Lk. Holm	Covington Creek	
41	3084	Covington Creek	747	24	20	1915		Auburn-Blackdiamond	Inters. SE 322nd St	Covington Creek	
42	3085	Covington	717	24	45	1929		Covington-Sawyer R	.7 Mi SE of Shw 516	Jenkins Creek	
43	3087	Big Soos Creek	747	24	36	1931		Kent-Blackdiamond	At SE 288th St	Big Soos Creek	
44	3092	L Wilderness Ox	717	38	24	1996		Witte Road	.5 Mi E of Hwy-169	Park Trail	
45	3097	Dorre Don Way	688	22.8	20	1945	1959	Dorre Don Way	1 Mi SE of Shw 169	Drainage Ditch	
46	3099	Maxwell Road	687	22.8	20	1939	1951	225th Ave SE	.5 Mi NE of Shw 169	Gem Creek	
47	3106	Soos Creek	716	20.3	17	1938		SE 244th St	.1 W of 148th Ave	Soos Creek	
48	3108	Soos Creek	716	33	25	1971		148th Ave SE	.2 Mi N of SE 240th	Soos Creek	
49	3109	Soos Creek	686	22.8	16	1949		SE 224th St	.3 Mi E 132nd Ave	Soos Creek	
50	3110	Soos Creek	686	20	15	1928		SE 208th St	.3 Mi E of SE 204th	Soos Creek	
51	3126	SE 277th St	715	62.8	16	1950	1973	SE 277th St	1.5 Mi E of I-5	Slough	1/2 Kent
52	3130	Alvord "T"	715	18	275	1914	1970	S 3rd Ave Kent	.3 Mi E of Shw 167	Green River	
53	3164	Cedar Grove	687	26	180	1962		Cedar Grove Rd	.2 Mi NE of Hwy 169	Cedar River	
54	3165	Cedar Mountain	657	50	291	2002		SE Jones Rd	.05 Mi E of Hwy 169	Cedar River Trail	
55	3166	Elliott Bridge	656	18.7	278	1951		Jones Road	.2 Mi N of Hwy 169	Cedar River	
56	3176	Peter Western	654	24	181	1950		S 116th St	.3 Mi W of Hwy 99	Drainage Ditch-Relief	
57	3179	South Park Bridge	625	40	1285	1931		14/16th Ave S	.8 Mi N of Shw 99	Duwamish River	1/2 Tukwila
58	3184	Judd Creek	683	24	370	1953		Vashon Hwy SW	.1 Mi S Quartermast	Judd Creek	
59	3188	Newaukum Creek	777	30	24	1927		SE 400th St	1 Mi E 212th Ave SE	Newaukum Creek	
60	3194	Wynaco	747	20	195	1964		168th Way SE	At Aub. Black Dia.	Covington Creek	
61	3198	Semanski	838	28	37	1963		252nd Ave SE	.1 Mi S of Shw 410	Boise Creek	
62	3201	SE 424th St	808	22.8	16	1951		SE 424th St	.6mi W 284th Ave SE	Watercress Creek	
63	3202	Maxwell Road	687	22.8	16	1952		225th Ave SE	.6 Mi N of Shw 169	Cattle Ux	
64	3205	Soos Creek	717	22.8	16	1951		172nd Ave SE	.2 Mi N of SE 240th	Soos Creek	
65	3216	Green River	716	48	250	1990		83rd Ave S	On S Central Av-Kent	Green River	1/2 Kent
66	3217	Overflow Channel	716	48	62	1990		83rd Ave S	On Central Ave-Kent	Cattle Crossing	
67	5003	Harris Creek	539	23	66	1947	1967	Kelly Rd NE	2 Mi NE of Hw-203	Harris Creek	
68	5005	May Creek	627	22.8	16	1950		SE May Valley Rd	.1 Mi E of Hwy -900	May Creek	
69	5007	Kelly Road	509	22.8	16	1959		Kelly Rd NE	1 Mi N of NE Lk Joy	Drainage Ditch	

	Br #	Br Name	1998 Thomas page #	Width	Length	Yr Built	Yr Reblt	Facilities Carried	Location	Features Intersected	Jurisdiction
71	5011	Shults	537	15	27	1953		NE 106th St	.1mi E Avondale Rd	Bear Creek	
72	5015	Lower Swamp Cr.	476	22.8	47	1951		NE 175th St	1 Mi W of Hw-522	Swamp Creek	Kenmore
73	5017	Hamlin Road Bridge	479	21	16	1949		Hamlin Road NE	.1 Mi NE Hwy 522	Mcaleer Creek	Lake Forest Park
74	5024	Carnation Farm Road	568	34	60	1997		NE Carnation Farm	.6 Mi W of Hw-203	Slough	
75	5028	Carnation Farm Rd Slough	539	34	40	1998		NE Carnation Farm	0.2 Mi W of Hw-203	Slough	
76	5032	Stossel Creek	163	16	30	1947	1967	Stossel Ck Rd	6.2 NE Kelly Rd	Stossel Creek	
77	5042	Cottage Lake Creek	507	35	35	1975		NE 130th St.	.1 Mi W Avondale Rd	Cottage Lake Creek	
78	5043	Old North Bend Way	630	52	92	1941		North Bend Way	.4mi SE of Meadowbr	Kimball Creek	
79	5044	4 Ck Ranch	658	28	42	1983		229 Drive SE	.5 S of Semay Vl Rd	Issaquah Creek	
80	5045	Mc Donald Highland	505	7.8	90	1982		School Ped. O.X.	.1 W of Juan. Dr Ne	N.E. 151 St	Kenmore
81	5046	Preston Frontage Road	629	28	316	1974		Upper Preston Road	.1 Mi SE of I-90	Raging River	
82	5047	Meadowbrook Pointe	597	28	40	1986		187 Ave SE	0.7 Mi N of I-90	Lewis Creek	
83	6001	Fort Dent Park Bridge	655	26	202	1975		Park Entrance Road	In Fort Dent Park	Green River	King County Park
84	6002	Marymoor Park Bridge	537	26	115	1963		Park Entrance Road	In Marymoor Park	Sammamish Slough	King County Park
91	1008E	Raging River	629	24	70	1915		SE 68th St.	0.1 E Fall City Rd	Raging River	
92	1008G	Raging River	629	28	169	1962		Preston Fall City	2 M NE of I-90	Raging River	
93	1011A3	Inglewood	567	34	63	1961		East Lake Sammamish	.5 N Inglewood Rd	Old S	Sammamish
94	1023A	Stossel Bridge	539	24	330	1951		NE Carnation Farm	.8 Mi W of Hwy 203	Snoqualmie River	
95	1056B	Bear Creek	477	37	20	1915		Woodinville-Duvall	1.3 Mi E Avondale	Bear Creek	
96	1071AE	East Kenmore Bridge	475	25.8	590	1970		Juanita Drive	.2 S Bothell Way	Sammamish River	Kenmore
97	1071AW	West Kenmore Bridge	475	25.8	590	1938		Juanita Drive	0.2 S Bothell Way	Sammamish River	Kenmore
98	1086A	Kimball Creek	630	25	43	1929	1965	SE 80th St	.4 Mi W of Shw-202	Kimball Creek	
99	1086B	Coal Creek	630	22.8	16	1950		378th Ave SE	.2 Mi S SE 80th St	Coal Creek	
100	1116A	Brissack Bridge	660	26	266	1971		436th Ave SE	.8 Mi S of I-90	S Fk Snoqualmie	
101	1135-1	North Bend #1	630	23.3	20	1951		Boalch Ave	0.2 N US Rt 2	Drainage Ditch	North Bend
85	1135-2	North Bend #2	630	17.2	76	1970		NW 8th Street	0.2 W of SR 202	Overflow Channel	North Bend
86	1135-3	North Bend #3	660	51.5	467	1941		W North Bend Way	3.2 E I-90	S Fork Snoqualmie R.	North Bend
87	1135-4	North Bend #4	660	52	164	1941		W North Bend Way	3.05 E Jct I-90	Overflow Channel	North Bend
88	1135-5	North Bend #5	660	47	22	1989		SW Mt Si Blvd	0.1 E of SR 202	Ribary Creek	North Bend
89	1135-6	North Bend #6	630	23	16	1951		Alm Way	0.3 N NW 8 St	Slough	North Bend
90	1135-7	North Bend #7	630	52	56	1941		W North Bend Way	0.9 Mi. W SR 202	Slough	North Bend
102	1136A	Duvall Bridge	508	24	1182	1951		Woodinville-Duvall	.1 Mi W of Hwy 203	Snoqualmie River	1/2 Duvall
103	1136B	Duvall Slough	508	24	639	1948		Woodinville Duvall	.4 Mi W of Hwy 203	Duvall Slough	
104	1136C	Woodinville-Duvall Rd	508	24	90	1948		Woodinville Duvall	.6 Mi W of Hwy 203	Duvall Slough	
105	1136D	Woodinville-Duvall Rd	508	24	70	1948		Woodinville Duvall	.8 Mi W of Hwy 203	Duvall Slough	

	Br #	Br Name	1998 Thomas page #	Width	Length	Yr Built	Yr Reblt	Facilities Carried	Location	Features Intersected	Jurisdiction
107	119A	Novelty Hill	537	35	32	1974		Novelty Hill Rd	.25 Ne of Avondale	Bear Creek	
108	122I	North Fork	630	22	252	1951		428th Ave SE	.1 Mi S SE Reinig	N Fk Snoqualmie R.	
109	122K	Norman Bridge	630	30	390	1984		428 Ave SE N Bend	.6 Mi S of S Reinig	Middle Fk. Snoqualmie R.	
110	122N	Tate Creek	630	22.8	16	1952		SE 73rd St	N. Fork Road SE	Tate Creek	
112	124B	124th St Bridge	506	65	22	1999		NE 124th St	..8 Mi E of 132nd Pl	Drainage Ditch	
113	124C	NE 124 St	507	28	114	1963		NE 124th St	.5 Mi W Wood-Red Rd	Sammamish River	
114	1320A	Ames Lake Trsl.	538	22.9	152	1924	1970	Ames Lk Carnation	.2 S of W Snoq.Rd	Ames Lake Creek	
115	1384A	Fifteen Mile Cr	658	24	64	1949		Issaquah Hobart Rd	.3 Mi S May Vall SE	Fifteen Mile Creek	
116	1384B	15 Mile Creek	658	18.5	30	1969		240 Ave SE	0.2 N Tiger Mt Rd	15 Mile Creek	
117	1413B	South Fork Kimball Creek	630	23.2	16	1954		Meadowbrook Rd	0.3 South of SR 202	Kimball Creek	Snoqualmie
118	1413C	East Fork Kimball Creek	630	23.2	16	1954		Meadowbrook Rd	0.1 Mi. S of SR 202	Kimball Creek	Snoqualmie
119	167AOX	Richmond Beach Oxing	474	24	103	1923	1956	27th Ave Nw	.5 W of 20th Ave Ne	Burlington Northern RR	Shoreline
120	167C	Hidden Lake	474	20	312	1931		10th Avenue NW	Nw Innis Arden Way	Side Hill Ravine	Shoreline
121	1726A	Meadowbrook Br	630	18.7	373	1921	1971	394 Pl SE Snoqual.	.7 Mi NE of Hw-202	Snoqualmie River	1/2 Snoqualmie
122	1730A	Bear Creek	537	23	20	1951	1997	NE 95th Street	0.3 E Avondale Rd	Bear Creek	Redmond
123	1741A	Issaquah Ck	658	22.8	54	1951	1974	252 Ave SE Issaq.	0.1 S Hobart Road	Issaquah Creek	
124	180A	Evans Creek	537	20	23	1917	1953	NE 150th St	.1 Mi SW of Hwy 202	Evans Creek	
125	180L	Patterson Creek	598	22.8	16	1951		SE 28th St	.2 Mi S of Hwy 202	Patterson Creek	
126	1834A	Tolt Bridge	569	19.3	696	1922	1968	NE 32 St-Carnation	0.5 W SR 203	Snoqualmie River	
127	186J	Fire Station	629	26	16	1915		Preston Fall City	.5 Mi SE of I-90	Unimproved Undercrossing	
128	2133A	Sikes Lake Trestle	538	21.9	260	1978		284 Ave NE - Tolt	0.1 N Ames Lake Rd	Over Sikes Lake	
129	225C	York Bridge	507	24	117	1950	1963	NE 116th St	.5 Mi W of Hwy 202	Sammamish River	1/2 Redmond
130	228A	W Snoqualmie Road	569	26	36	1965		NE 18th St	W Snoq. R Rd NE	Drainage Ditch	
131	228D	West Snoqualmie Road	569	22.8	16	1950		Snoqualmie River Rd	2 Mi S Tolt Hill Rd	Drainage Ditch	
132	228E	Patterson Creek	599	26	50	1969		Snoqualmie River Rd	.4 Mi N of SE 24th	Patterson Creek	
133	228F	312 Ave SE	599	22.8	20	1924	1950	Snoqualmie River Rd	.25 Mi N of SE 24th	Drainage Ditch	
134	234A	Raging River	599	40	200	1998		Preston-Fall City	.25 Mi S of Hwy 202	Raging River	
135	240A	Cottage Lake Cr	507	22.8	18	1951		Bear Ck Road	.1 Mi E Avondale Rd	Cottage Lake Creek	
136	249A	C.W. Neal Road	599	22.8	16	1951		C.W. Neal Road	Fall City-Carn. Rd	Drainage Ditch	
137	249B	C.W. Neal Road	599	22.8	16	1951		C.W. Neal Road	1.5 Mi S of Hwy 203	Drainage Ditch	
138	249C	C.W. Neal Road	599	22.8	20	1951		C.W. Neal Road	.3 Mi S of Hwy 203	Drainage Ditch	
139	2550A	Mt. Si Bridge	660	19	290	1955	1960	Mount Si Road	.4 N of SE North Bend	Middle Fk Snoqualmie	
140	257Z	Horseshoe Lake Creek	539	16.8	18	1930	1969	310th Ave NE	.2 N of Carn. Farm	Horseshoe Lake Creek	
141	2605A	Foss River	164	14	120	1951		Foss River Road	0.8 SE SR 2 Mp 50.6	Foss River	

	Br #	Br Name	1998 Thomas page #	Width	Length	Yr Built	Yr Reblt	Facilities Carried	Location	Features Intersected	Jurisdiction
143	264Z1	Mcaleer Creek	475	24	24	1949		Shore Drive NE	.2 Mi SE of Hwy 522	Mcaleer Creek	Lake Forest Park
144	264Z2	Mcaleer Creek	475	24	24	1949		45th Av NE	0.2 SE Bothell Way	Mcaleer Creek	Lake Forest Park
145	264Z3	Mcaleer Creek	475	24	24	1949		Beach Drive NE	0.1 SE Bothell Way	Mcaleer Creek	Lake Forest Park
146	267X	Cherry Valley Trestle	630	24	181	1951		315th Wy NE	.5 Mi N Cherry Rd	Cherry Creek	
147	271AOX	Tokul Creek Ox	600	38	100	1988		Tokul Road	.7 Mi NE of Hwy 202	Old Milwaukee RR Bed	
149	3035A	Coal Creek	779	17.8	49	1958		Lake Walker Rd	1.5 SE Veazie-Cumb	Cool Creek	
150	3037OX	Kanaskat Oxing	749	22.5	157	1959		Cumberland-Kanaske	At Kanasket Kangl	Northern Pacific RR	
151	3040A	Newaukum Creek	808	26.8	20	1959		284th Ave SE	.3 Mi N of SE 416th	Newaukum Creek	
152	3050A	Greenwater River Bridge	841	19	19	1964	1996	SE 496th Pl	.3 Mi NE of Shw 410	Packard Creek	
153	3050B	Greenwater	841	11	110	1973		Two County Road	.2 Mi NE of Shw 410	Greenwater River	1/2 Pierce County
154	3055A	Boise X Connection	838	21	37	1956		244th Ave SE	2.0 S Enumclaw	Boise Creek	
155	3056A	SE 408th St	807	28	16	1927		SE 408th St	.2 Mi E of Shw-164	Drainage Ditch	
156	3085P	Covington Way Ped Bridge	717	8	65	1998		Pedestrian Pathway	350' SE of Wax Road	Jenkins Creek	
157	3086OX	Berrydale Ox	747	24	105	1931	1968	Kent-Blackdiamond	At SE 291st	Burlington Northern RR	
158	3094OX	Gravel Pit Ox	717	19	79	1988		SE 231st St	1 Mi E of Hwy 169	Abandoned RR Grade	
159	3096OX	Maplevalley Overcrossing	688	42	24	1994		SE 216th Way	.05 Mi E of Hwy 169	King County Park Trail	
160	3099A	Gem Creek	687	25	22	1989		SE 206th Street	.5 Mi East of SR 169	Gem Creek	
161	3109A	Soos Creek	686	18.6	15	1959		SE 216th St	.3mi E 132nd Ave SE	Soos Creek	
162	3109B	Lk. Youngs' Way	686	38.8	16	1969		SE Lk Youngs Way	.3 NE of SE 208th	Soos Creek	
163	3145A	Miller Creek	655	38	20	1969		S 156th Wy	At 9th Ave S	Miller Creek	SeaTac
164	3165A	Cedar Mt. Ramp	657	20	16	2002		Cedar Mtn Place SE	.05 Mi E of Shw-169	Cedar River Trail	
165	3176A	Puget S. Hs Ox	625	5.5	326	1959	1996	Pedestrian Ox	1st Ave S & Sw 126	Hwy 509	
166	333A	Bear Creek	507	22.8	20	1950		NE 133rd St	.25 Mi E Bear Crk	Bear Creek	
167	344A	Patterson Creek	599	22.8	20	1951		310th Ave SE	.8 Mi NE of Hwy 202	Patterson Creek	
168	344B	308th Ave SE	599	22.8	16	1950		308th Ave SE	.2 Mi N of Hwy 202	Patterson Creek	
169	359A	Granite Creek	173	14	30	1967		Private Road	6 Mi. Ea. Northbend	Granite Creek	
170	359B	Lake Dorothy Bridge	173	26	339	1963		SE Lake Dorothy Rd	5.1 E 468 Ave	Middle Fork Snoqualmie R	
171	359C	Lake Dorothy Overflow Br	173	29	20	1963		SE Lake Dorothy Rd	6 Mi. E Northbend	Overflow	
172	359D	Lake Dorothy Overflow	173	14	38	1962		SE Lake Dorothy Rd	9 Mi. E Northbend	Overflow	
173	364A	Deep Creek	163	18	109	1965		North Fork Rd SE	13.7 N Northbend	Deep Creek	
174	364B	Wagners Bridge	163	10	203	1977		North Fork Rd SE	13.5 N Northbend	N Fork Snoqualmie River	
175	364C	Sunday Creek	163	14	80	1962	1977	North Fork Rd SE	17.4 N Northbend	North Fork Snoqualmie R.	
176	368B	May Creek Trestle	626	24	204	1951		Coal Ck Pkwy SE	.25 Mi N SE 95th Wy	May Creek	Newcastle
177	404B	Novelty Bridge	508	47	623	2000		NE 124 St.-Novelty	0.5 W of SR 203	Snoqualmie River	
178	422A	Beaver Lake Trestle	598	40	389	1968	1994	SE 24th St	.6 Mi E 228 Ave SE	Slough	Sammamish

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180	480A	Bear Creek	507	22.8	18	1951		NE 116th St	.1 Mi E Avondale	Bear Creek	
182	493C	Fifteen Mile Creek	658	26.9	38	1932	1973	SE May Valley Rd	.2 W Issaq- Hobart	Fifteen Mile Creek	
183	5009B	Snoqualmie Valley Rd	538	22.8	16	1951		W Snoqualmie Vly R	.5mi N Ames Lk. Rd	Drainage Ditch	
184	5024A	Patterson Ck	539	18	18	1938	1971	264th Ave SE	.1 Mi S of Shw-202	Patterson Creek	
185	5034A	Lake Joy Bridge	539	22.8	16	1950		346th Pl NE	On NE Lake Joy Rd.	Lake Joy Creek	
186	506A	Money Creek Bridge	164	14	220	1958		NE Money Creek Rd.	2 Mi S of Hwy 2	Money Creek	
187	509A	Baring Bridge	483	8.3	340	1930	1952	NE Index Ck Rd	0.1 Mi S of Hwy 2	Skykomish River-S Fork	
188	52B	Cottage Lk Cr	507	22.8	20	1951		NE 165th St	1\2 Mi W of Avondal	Cottage Lk Cr	
189	52C	Bear Creek	507	66	123	1995		Avondale Road	3.0 N Redmond	Beare Creek	
190	52D	Bear Creek	507	26	45	1950		Avondale Pl. NE	.3 N of NE 116th St	Bear Creek	
191	52E	Bear Creek Bridge	507	66	67	1995		Avondale Road	.5 Mi N of NE 116th	Bear Creek	
192	52F	Cottage Lake Creek	507	40	21	1987		NE 159th St.	.1 W of Avondale Rd	Cottage Lake Creek	
193	52H	Cottage Lake Creek	507	66	48	1994		Avondale Road NE	315' S of NE 132nd	Cottage Lake Creek	
194	578A	Evans Creek	537	22.8	20	1950		Redmond-Fall Ci Rd	.5 Mi W 204th Pl NE	Evans Creek	
195	593C	May Creek	627	22.6	16	1951		164 Ave SE	.05 Mi N of Hwy 900	May Creek	
196	615A	Smith Parker Bridge	599	34	125	1998		328 Way SE	0.0 W Fall City Rd	Raging River	
197	617B	Edgewick	661	19.5	186	1951		Edgewick Road	1.3 S of Int 90	S. Fk. Snoqualmie River	
198	61B	Fish Hatchery	600	22.8	20	1950		SE Fish Hatchery R	.8 Mi Sw of Hwy 202	Drainage Ditch	
199	61G	Tokul Cr Park	600	22	85	1950		Fish Hatchery Rd	.8 Mi S of Hwy 202	Tokul Creek	
200	682A	Preston Bridge	629	20	260	1957		Lovegren Rd.	.1 E of Prest-Fall	Raging River	
201	72A	May Creek	627	22.8	16	1951		148th Ave SE	.8 Mi N of Hwy 900	May Creek	
202	83B	Issaquah Creek	658	22.8	40	1952		SE 156th St	04.8 S Issaquah	Issaquah Creek	
203	83D	Issaquah Creek	658	26	42	1962		Cedar Grove Rd	.05 Mi N of SE 156th	Issaquah Creek	
204	891A	Kimball Super Span.	630	32	25	1971		384th Ave SE	.4 N SE N.Bend Wy	Kimball Creek	
205	896A	Rock Creek Bridge	689	17	61	1994		SE 208th St	4.2 E Issaq-Hobart	Rock Creek	
206	896B	Kerristan Bridge	689	14	22	1996		208th SE	6.8 Mi E of Issa-Ho	Raging River	
207	896C	Kerristan Bridge	689	14	32	1996		208th SE	6.8 Mi E of Issa-Ho	Raging River	
208	909B	Clough Ck. (Kimball Ck.)	660	22.8	16	1951		SE 141st St	1.6 S Int 90	Clough Creek	
209	916A	W Snoqualmie River Road	569	22.8	20	1951		W Snoqualmie Ri Rd	.8 Mi S NE Tolt Rd	Slough	
210	920A	Rutherford Slogh	599	22.8	20	1950		SE 39th Pl	.4 Mi NE of Hw-203	Rutherford Slough	
211	927B	Patterson Creek	599	12.8	21	1951	1973	300th Ave SE	.1 Mi S of Hw-202	Patterson Creek	
212	952A	Evans Creek	537	22	23	1913		NE Union Hill Rd	1.3 E Avondale Rd	Evans Creek	
213	952B	Evans Creek	537	22	32	1913		196th Ave NE	.9 Mi N of Hw-202	Evans Creek	

	Br #	Br Name	1998 Thomas page #	Width	Length	Yr Built	Yr Rebit	Facilities Carried	Location	Features Intersected	Jurisdiction
215	999K2	Scenic Bridge	164	19	61	1960		County Road	0.1 S of Hwy 2	Tye River	
217	999X	Cascade Scenic Hwy	514	22.8	20	1950		Cascade Scenic Hwy	1.3 Mi SE of Hwy 2	Miller River Slough	
218	999Z	Skykomish River	514	24	255	1957		Money Creek Rd	.1 Mi SE of Hwy 2	Skykomish River	
219	99L	Kimball Cr	630	10	45	1960	1973	SE 76th St	.5 Mi W of Hwy 202	Kimball Creek	
220	MEDINA #1	Overlake Dr	566	23	61	1946	1968	Overlake Dr	0.5 E Jct 84th Ave	Seasonal Streamlet	Medina
221	MEDINA #2	Overlake Dr	566	23	61	1946	1968	Overlake Dr	0.6 E Jct 84th Ave	Seasonal Drainage	Medina
222	SKYKOM -10	Maloney Creek	515	34.4	54	1982	0	Old Cascade Hwy	0.10 W 5th Street	Maloney Creek	Skykomish

Table 2 - BRIDGES INSPECTED BY UBIT, F/C or SPECIAL

	Bridge Name	Type of Inspections	Last UBIT/FC/Special Inspection	Insp. Freq.
1	Duvall Bridge (#1136A)	UBIT	6/30/2001	24
2	Preston Bridge (#682A)	UBIT, F/C	7/16/2001	24
3	Baring (#509A)	Special	8/9/2002	24
4	Brissack (#1116A)	UBIT	7/19/2002	48
5	Cedar Grove (#3164)	UBIT	7/15/2002	48
6	Edgewick (#617B)	UBIT, F/C	8/13/2002	24
7	Elliott Bridge (#3166)	UBIT, F/C	8/14/2002	24
8	Foss River (#2605A)	UBIT, F/C	8/19/2002	24
9	Judd Creek (#3184)	UBIT	8/2/2002	24
10	Kanasket Arch (#3036)	UBIT	6/17/2002	24
11	Landsburg (#3075)	UBIT	7/15/2002	60
12	Miller River Bridge (#999W)	UBIT, F/C	8/19/2002	24
13	North Bend # 3 (#1135-3)	UBIT	7/19/2002	24
14	Patton Bridge (#3015)	UBIT, F/C	6/14/2002	24
15	Skykomish River (#999Z)	UBIT	5/13/2002	24
16	York Bridge (#225C)	UBIT	8/12/2002	24
17	Alvord "T" (#3130)	UBIT, F/C	7/20/2001	24
18	Flaming Geyser (#3024)	UBIT, F/C	6/29/2001	24
19	Green River Gorge (#3032)	UBIT, F/C	12/21/2001	24
20	Kanasket Ox (#3037OX)	UBIT	6/19/2001	24
21	Lake Dorothy (#359B)	UBIT	7/26/2001	24
22	Meadowbrook (#1726A)	UBIT, F/C	7/20/2001	24
23	Neely Bridge (#3014)	UBIT	6/29/2001	24
24	North Fork (#122I)	UBIT	7/26/2001	24
25	Novelty Bridge (#404B)	UBIT, F/C	9/28/2001	24
26	Stossel Bridge (#1023A)	UBIT, F/C	7/20/2001	24
27	Tolt Bridge (#1834A)	UBIT, F/C	7/20/2001	24
28	Wynaco (#3194)	UBIT	6/19/2001	24
29	Ames Lake Trestle (#1320A)	UBIT	8/17/2000	48 then 24
30	Cedar Mountain (#3165)	UBIT	Scheduled in 2004	48
31	Green River (#3216)	UBIT, F/C	6/12/2000	48
32	May Creek (#368B)	UBIT	3/25/1999	48
33	Mt. Si Bridge (#2550A)	UBIT, F/C	8/15/2002	24
34	Preston Frontage Road (#5046)	UBIT	3/25/1999	48
35	Smith Parker (#615A)	F/C	5/10/2001	24
36	West Kenmore (#1071AW)	UBIT	7/10/2000	48
37	Whitney (#3025)	UBIT	5/23/2000	48
38	Lee Hill (#3013)	UBIT	6/14/2002	72
39	Fort Dent (#6001)	UBIT	6/10/2002	72
40	Cherry Valley (#267X)	UBIT	8/12/2002	48
41	South Park (#3179)	UBIT, F/C	8/12/2001	24
42	Peter Western (#3176)	UBIT	6/10/2002	72
43	East Kenmore (#1071AE)	UBIT	7/10/2000	48

Table 2A - BRIDGES INSPECTED USING UNDERWATER EQUIPMENT

Bridge Name	Type of Inspections	Last U/W Inspection	U/W Frequency
Cottage Lake (#52B)	U/W	01-Oct-01	60
Cottage Lake (#52H)	U/W	01-Oct-01	60
East Redmond (#952C)	U/W	01-Oct-01	60
Novelty Hill (#119A)	U/W	01-Oct-01	60
South Park 14th/16th (#3179)	U/W	09-Nov-00	36
W Snoqualmie River Road (#916A)	U/W	01-Oct-01	60
Beaver Lake Trestle (#422A)	U/W	01-Nov-02	60
Duvall Slough (#1136B)	U/W	08-Nov-00	60
Sikes Lake Trestle (#2133A)	U/W	08-Nov-00	60
Soos Creek (#3109)	U/W	17-Sep-02	60
Evans Creek (#180A)	U/W	18-Sep-00	60
Issaquah Creek (#83B)	U/W	17-Sep-02	60
Hylebos Creek (#3005)	U/W	17-Oct-01	60
East Kenmore (#1071AE)	U/W	01-Jun-01	60
West Kenmore (#1071AW)	U/W	01-Jun-01	60
Stossel Bridge (#1023A)	U/W	08-Nov-00	60
Tolt Bridge (#1834A)	U/W	21-Aug-00	60
Duvall Bridge (#1136A)	U/W	21-Aug-00	60

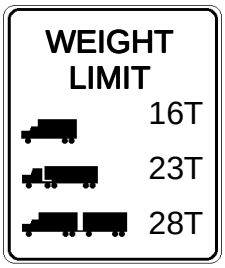

Table 3 – LOAD LIMITED BRIDGES

	Br #	Name	Location	Type 3 (3 Axle Truck)	Type 3S2 (5 Axle Truck)	Type 3-3 (6 Axle Truck)	Detour Route	Vert_Cl
1	225C	York Bridge	NE 116th St. - across Sammamish River, just N of Redmond.	16T	23T	28T	Use 124th St	
2	257Z	Horseshoe Lake Creek	310 Ave NE, about 1/4 mile N of NE Carnation Farm Rd. N of Carnation	20T	32T	39T	None	
3	364B	Wagners Bridge	Fury Lake Rd., 20 miles NE of North Bend, over N Fork Snoqualmie River.	11T	14T	16T	None	
4	509A	Baring Bridge	NE Index Creek Rd., Over S Fork of Skykomish River, 1/2 mile SE of Baring	10T	10T	10T	None	
5	617B	Edgewick	468 Ave SE over S Fork of Snoqualmie R. 3/4 mile S of I-5, east of North Bend	18T	28T	34T	None	14.25 ft
6	682A	Preston Bridge	SE 86 St. over Raging River at Preston	16T	16T	20T	Use Upper Preston Road	
7	999W	Miller River Br	Old Stevens Pass Hwy over Miller R. W. of Skykomish	23T	OK	OK	Use Stevens Pass Way	13.50 ft
8	1726A	Meadow-Brook Br	Meadowbrook Way over Snoqualmie R. in Snoqualmie	16T	26T	32T	Use Reinig Rd via 428th Ave	14.00 ft
9	1834A	Tolt Bridge	NE Tolt Hill Rd., over Snoqualmie River, 1/2 mile west of Carnation	17T	27T	34T	Carnation to Fall City - Redmond Rd	14.50 ft
10	2550A	Mt. Si Bridge	Mount Si Rd. over the Middle Fork of Snoqualmie River, 1/2 mile E of North Bend	16T	26T	32T	None	15.00 ft
11	3130	Alvord "T"	S. 3rd Ave at S. 259th St over Green River. S of Kent	20T	30T	40T	Use Central Ave	13.67 ft
12	3166	Elliott Bridge	149 Ave SE over the Cedar River 1/4 mile N of SR-169, E of Renton	16T	18T	20T	Use Jones Rd and Maple Valley Hwy	14.00 ft
13	3194	Wynaco Bridge	168 Wy SE over Covington Creek, E of Auburn	15T	18T	19T	Kent Black Diamond Road and Auburn Black Diamond Road	
14	5003	Harris Creek	Kelly Rd NE over Harris Ck. at NE Big Rock Rd, between Duvall and Carnation	20T	31T	40T	Use NE Big Rock Road and NE Cherry Valley Rd.	
15	5008	Kelly Rd/ Cherry Creek	Kelly Rd NE over Cherry Ck. E. of Duvall	21T	OK	40T	Use NE Big Rock Road and Kelly Rd. NE	

Table 3A - OVER-LEGAL LOAD PERMITS

			Multi-Use Permits Issued		
Bridge Number	Name	Total No. of Permits For 2002	No. of Multi-Use Permits For 2002	From	Thru
404B	**Novelty Bridge**	1	--		
617B	**Edgewick Bridge**	3	*3*	*12/14/2001*	*6/30/2002*
1136A	**Duvall Bridge A**	4	*3*	*2/22/2002*	*12/31/2002*
1320A	**Ames Lake Trestle**	1	--		
1834A	**Tolt Hill Bridge**	2	*2*	*1/24/2002*	*12/31/2002*
2550A	**Mount Si Bridge**	4	--		
3106	**Soos Creek Bridge**	1	--		
3165	**Cedar Mountain Bridge**	1	--		
5003	**Harris Creek Bridge**	3	--		
5009B	**West Snoqualmie Bridge**	1	--		
3038	**Veazie Bridge**	1	--		
3166	**Elliott Bridge**	5	*2*	*4/17/2002*	*12/31/2002*
	Total:	**27**			

Table 4 – REPLACEMENT/REHAB PRIORITY RESULTS AND CIP PROJECT STATUS

Rank	Br #	Bridge Name	Total Rating	Project #	Project Start	Const Year	Remark/Scope
1	3166	Elliott Bridge	92.59	401288	1985	2004	Replacement (Federal Grant)
2	1834A	Tolt Bridge	78.03	200394	1995	2004	Replacement (Federal Grant)
3	2550A	Mt. Si Bridge	72.05	200994	1999	2007	Replacement (Federal Grant)
4	1726A	Meadowbrook Br	71.10	200294	1995	2005	Rehabilitation (Federal Grant)
5	509A	Baring Bridge	67.65				Upgraded capacity to 10 Tons in 1995. No major rehab planned.
6	617B	Edgewick	63.42	200498	1999	2004	Replacement (Federal Grant)
7	3179	South Park Bridge	62.71	300197	1998	2007	Replacement-or rehabilitation/EIS
8	3179	South Park Bridge	62.71	300988	1990		Maintenance / Repair (on-going)
9	**364B**	**Wagners Bridge**	**61.05**				**Recommended for New CIP Project**
10	999W	Miller River Br	49.29				Major repairs done in 1997; Included painting, but not seismic
11	3130	Alvord "T"	48.17	500195			Maintenance repairs done in 1997. Maintenance Agreement with Kent
12	682A	Preston Bridge	46.08	200397	1998	2003	Replacement (Federal Grant)
13	3086OX	Berrydale Ox	44.10	400600	2000	2006	Replacement (Need agreement with BNSF)
14	124C	NE 124 St	42.98	100389	1997	2003	Replacement (Federal Grant)
15	225C	York Bridge	42.83	100298	1999	2004	Replacement with City of Redmond (Federal Grant)
16	3194	Wynaco	41.66	400102	2002	2004	Rehabilitation (Federal Grant)
17	257Z	Horseshoe Lake Creek	38.28			2005	Load upgrade as part of the RDCW10 program
18	5008	Kelly Rd Cherry Creek	36.66	200600	2001	2004	Repair and Load upgrade recommended
19	180L	Patterson Creek	35.82	200108	2008		Replacement
20	**333A**	**Bear Creek**	**34.44**				**Recommended for New CIP Project**
21	**1384A**	**Fifteen Mile Creek**	**33.79**				**Recommended for New CIP Project**
22	1136B	Duvall Slough	32.88	200200	2000	2006	Replacement (Federal Funds)
23	5003	Harris Creek	32.82	500399	2001	2008	Replacement
24	122N	Tate Creek	32.55	200308	2008		Replacement
25	493B	Bandaret	32.37				
26	3106	Soos Creek	31.95	500399	2001	2008	Replacement
27	240A	Cottage Lake Cr	31.75				
28	1136C	Woodinville-Duvall Rd.	31.49				
29	5005	May Creek	31.40	200308	2008		Replacement
30	1136E	Woodinville-Duvall	30.25				

Table 5 – BRIDGE SEISMIC RETROFIT PROGRAM PROJECTS

Bridge #	Bridge Name	Design Start	Retrofit Construction
344B	308th Ave SE	2000-01	Completed 7/01
3179	South Park Bridge	1999	Completed seismic vulnerability study 8/01
344A	Patterson Ck	2000-01	Completed 9/01
333A	Bear Ck.	2000-01	Completed 9/01
916A	W. Snoqualmie River Rd	2000-01	Completed 9/01
3205	Soos Creek	2000-01	Completed 9/01
257Z	Horseshoe Lake Creek	2000-01	Completed 9/01
249A	C.W. Neal Rd.	2000-01	Completed 10/01
249B	C.W. Neal Rd.	2000-01	Completed 10/01
249C	C.W. Neal Rd.	2000-01	Completed 10/01
3037OX	Kanaskat OX	1999	Completed in 2/02 (Fed. funded)
228F	312 Ave. SE	2000-01	Completed 2002
2133A	Sikes Lake Trestle	2000	Completed 2002 (Fed. funded)
1086B	Coal Creek Bridge	2002	2002
122I	North Fork Bridge	2000	2003 (Fed. funded)
3194	Wynaco	2000	2003
3063	Newaukum Creek	2002	2003
3060	208th Ave SE	2002	2003
3030	SE 380 St	2002	2003
3201	SE 424th St	2002	2003
909B	Kimball Creek	2002	2003
3041	Newaukum Creek	2002	2003
3038	Veazie Bridge		2003
3075	Landsburg Bridge		2003
2605A	Foss River Bridge	2001	2003 (Fed. funded)
999Z	Skykomish Bridge	2001	2003 (Fed. funded)
364A	Deep Creek Bridge	2003	2004 (Fed. funded)
271B	Upper Tokul Creek	2003	2004 (Fed. funded)
3050B	Greenwater Bridge	2003	2005
1008G	Raging River	2004	2005 (Fed. funded)

Table 6 - PAINTING

	Br. #	Bridge Name	Painting Schedule
1	615A	Smith Parker	Replaced in 1998
2	404B	Novelty	Replaced in 2000
3	617B	Edgewick	Replacement candidate
4	1834A	Tolt Br.	Replacement candidate
5	3166	Elliott Br.	Replacement candidate
6	2550A	Mt. Si	Replacement candidate
7	3179	14/16th Ave S.	Replacement candidate
8	1726A	Meadow Brook	Replace/Rehab candidate
9	3130	Alvord T	Agreement with City of Kent to maintain the structure in the existing condition
10	3032	Green River Gorge	2001- Completed
11	3014	Neely Br.	1999 - Completed
12	999Z	Skykomish	1998 - Completed
13	999K2	Scenic Bridge	1998 - Completed
14	999W	Miller River Br.	1997 (w / Repair) - Completed
15	2605A	Foss River	1997 - Completed
16	364A	Deep Ck.	1997 - Completed
17	122I	North Fork	1997 - Completed
18	3050B	Green Water	1997 - Completed
19	1384B	15 Mile Ck.	1996 - Completed
20	3035A	Coal Ck.	1996 - Completed
21	3015	Patten Br.	1996 - Completed
22	1023A	Stossel Br.	1995 - Completed
23	3055A	Boise X Connection	1995 - Completed
24	682A	Preston Br.	1994 - Completed
25	3216	Green River Br.	2005